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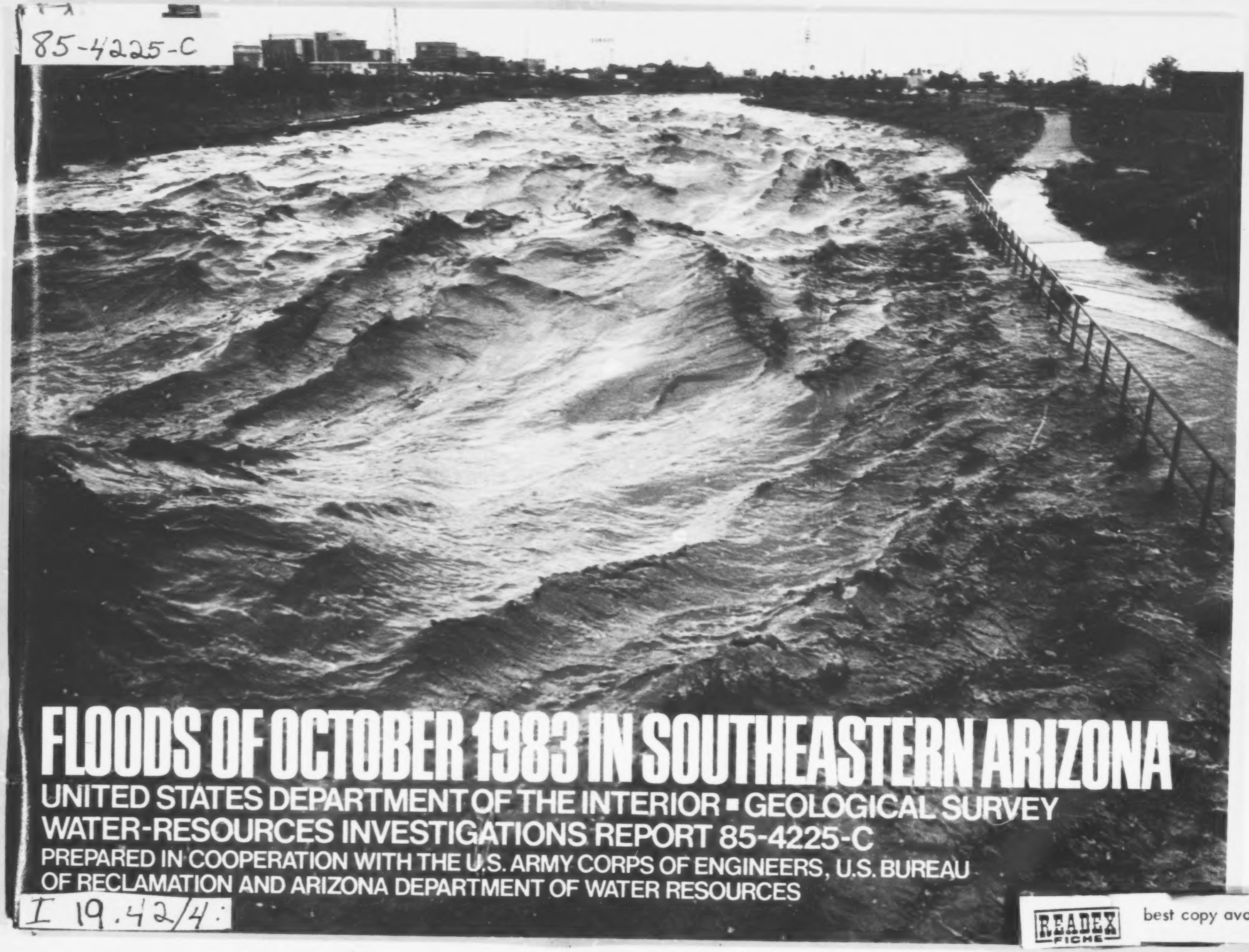

FLOODS OF OCTOBER 1983 IN SOUTHEASTERN ARIZONA

UNITED STATES DEPARTMENT OF THE INTERIOR ▪ GEOLOGICAL SURVEY
WATER-RESOURCES INVESTIGATIONS REPORT 85-4225-C
PREPARED IN COOPERATION WITH THE U.S. ARMY CORPS OF ENGINEERS, U.S. BUREAU
OF RECLAMATION AND ARIZONA DEPARTMENT OF WATER RESOURCES

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Cover: View of the Santa Cruz River looking upstream from St. Mary's Road, Tucson, Arizona, October 2, 1983. Photograph by Peter L. Kresan.

FLOODS OF OCTOBER 1983 IN SOUTHEASTERN ARIZONA

R.H. Roeske, J.M. Garrett, and J.H. Eychaner

U.S. GEOLOGICAL SURVEY

Water-Resources Investigations Report 85-4225-C

Prepared in cooperation with the
U.S. ARMY CORPS OF ENGINEERS, U.S. BUREAU OF RECLAMATION and
ARIZONA DEPARTMENT OF WATER RESOURCES

U.S. DEPARTMENT OF THE INTERIOR
March 3, 1849

Tucson, Arizona
March 1989

DEPARTMENT OF THE INTERIOR
DONALD PAUL HODEL, Secretary

U.S. GEOLOGICAL SURVEY
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For readers who prefer to use International System (SI) units rather than the inch-pound terms used in this report, the following conversion factors may be used:

Multiply inch-pound unit	By	To obtain SI unit
inch (in.)	25.4	millimeter (mm)
foot (ft)	0.3048	meter (m)
mile (mi)	1.609	kilometer (km)
square mile (mi^2)	2.590	square kilometer (km^2)
acre-foot (acre-ft)	0.001233	cubic hectometer (hm^3)
cubic foot per second (ft^3/s)	0.02832	cubic meter per second (m^3/s)

Sea level: In this report "sea level" refers to the National Geodetic Vertical Datum of 1929 (NGVD of 1929)—a geodetic datum derived from a general adjustment of the first-order level nets of both the United States and Canada, formerly called "Sea Level Datum of 1929."

ABSTRACT

Tropical storm Octave off the coast of Baja California, was the main use of the outstanding floods on the San Francisco, Gila, San Pedro, and Santa uz Rivers and other smaller streams. The long period of rainfall from ptember 27 to October 3 was the result of the interaction of a high-altitude w-pressure trough and a persistent supply of moist tropical air mainly sociated with tropical storm Octave. This was the sixth major flood in uthern or southeastern Arizona in 21 years that was caused by a tropical storm hurricane.

The San Francisco River was the major source of flood runoff in the la River above Coolidge Dam. The peak discharge of 90,900 cubic feet per cond on the San Francisco River at Clifton was the largest since at least 1870. wnstream from the San Francisco River, the peak discharge on the Gila River s the largest since at least 1906 and the peak discharge was 150,000 cubic feet per second just upstream from San Carlos Reservoir where the flood was stored. Downstream from the reservoir, a flood of nearly equal magnitude entered the Gila River from the San Pedro River. The flood in the San Pedro River originated in the lower half of the basin and came mainly from Aravaipa Creek where the peak discharge exceeded the previous maximum by 3.5 times. The flood on the Santa Cruz River was the largest on record from Continental to the junction with the Gila River. At Tucson, where the record began in 1915, the peak discharge was 2.2 times the previous maximum. Along the lower part of the Santa Cruz River, the flood spread over a broad area. At Interstate 8, the inundated area was more than 8 miles wide. The floods at 19 gaging stations had recurrence intervals greater than 70 years and at 9 stations the recurrence intervals were greater than 100 years. Large channel changes took place on many streams, particularly in the San Pedro and Santa Cruz River basins. Eight lives were lost as a result of the floods, and flood damage was estimated to be $226.5 million.

Tropical storm Octave was the main cause of the outstanding floods of October 1983 in southeastern Arizona and part of western New Mexico (fig. 1). The long period of rainfall from September 27 to October 3 was the result of the interaction of a high-altitude low-pressure trough and a persistent supply of moist tropical air that was vastly increased on September 30 by the arrival of moisture associated with tropical storm Octave. As much as 11 in. of rain fell during the 7-day storm period. The persistent rains led to record floods on the San Francisco, Gila, San Pedro and Santa Cruz Rivers and other smaller streams. This was the sixth major flood in southern or southeastern Arizona in 21 years that was caused by a tropical storm or hurricane. The report was prepared in cooperation with the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, and the Arizona Department of Water Resources.

Purpose and Scope

The purpose of this report is to describe the floods and to document the significance in the hydrologic record. Flood data were collected at 96 sites—93 streamflow-measuring sites and 3 reservoir sites (fig. 2). Flood hydrographs, maximum stages and discharges, and previous maximums are included. Rainfall data, flood volumes, flood traveltimes, flood frequency, inundated areas, channel changes, and flood damage are also included.

This report is the third of three reports that describe the floods of October 1983. Garrett and others (1986) show inundated areas in three reaches of the Gila River and provide a brief discussion of the runoff and flood frequency in the three reaches. H.W. Hjalmarson, (hydrologist, U.S. Geological Survey, written commun., 1986) describes the flood of October 1 and 2, 1983, in Clifton, Ariz., and discusses the history of flooding in Clifton.

Cooperation and Acknowledgments

The authors wish to acknowledge the assistance of personnel of cooperating agencies and also personnel of the following agencies and organizations. Federal agencies include Federal Emergency Management Agency, National Climatic Data Center, National Environmental Satellite Data and Information Service, National Weather Service, U.S. Forest Service, U.S. Bureau of Land Management, and U.S. Soil Conservation Service. State agencies include Arizona State Parks, Arizona State Land Department, Arizona Department of Transportation, and State of New Mexico Highway Department. Local agencies include Pima County Transportation and Flood Control District, Maricopa County Flood Control District, and the University of Arizona, Tree-Ring Laboratory. Other organizations include Southern Pacific Transportation Company; Cella, Barr, and Associates; and Phelps Dodge Corporation.

Data were collected as part of the cooperative programs between the U.S. Geological Survey and Federal, State, County, municipal, and other agencies. The U.S. Bureau of Reclamation provided rainfall data from a field survey and from responses to requests for rainfall data published in local newspapers. Streamflow data were obtained from published reports and from the files of the U.S. Geological Survey District offices in Arizona and New Mexico.

Special thanks are extended to Phil Camp of the U.S. Soil Conservation Service and LeRoy Williams, Public Works Director of the City of Eloy, for their assistance in determining and verifying inundation boundaries along the Santa Cruz River. Many residents in the area also provided valuable information on flood boundaries. Thanks are due also to the many individual observers who contributed rainfall data.

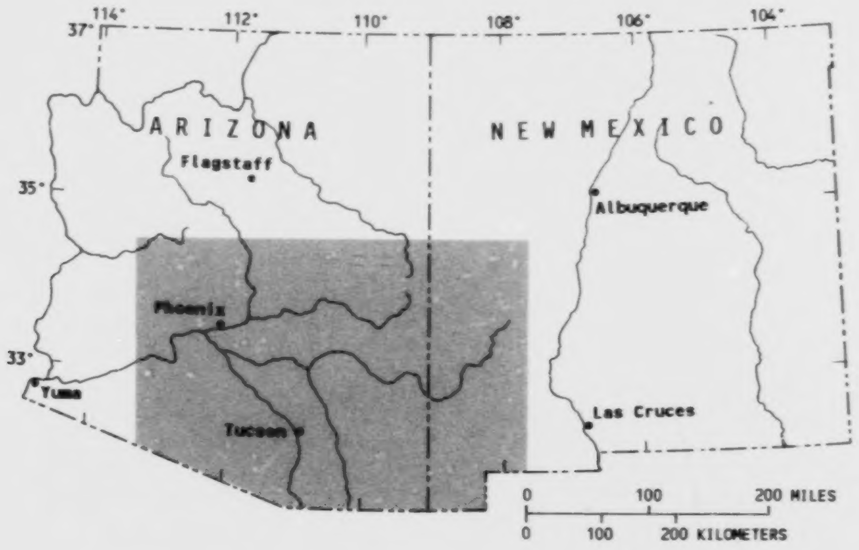
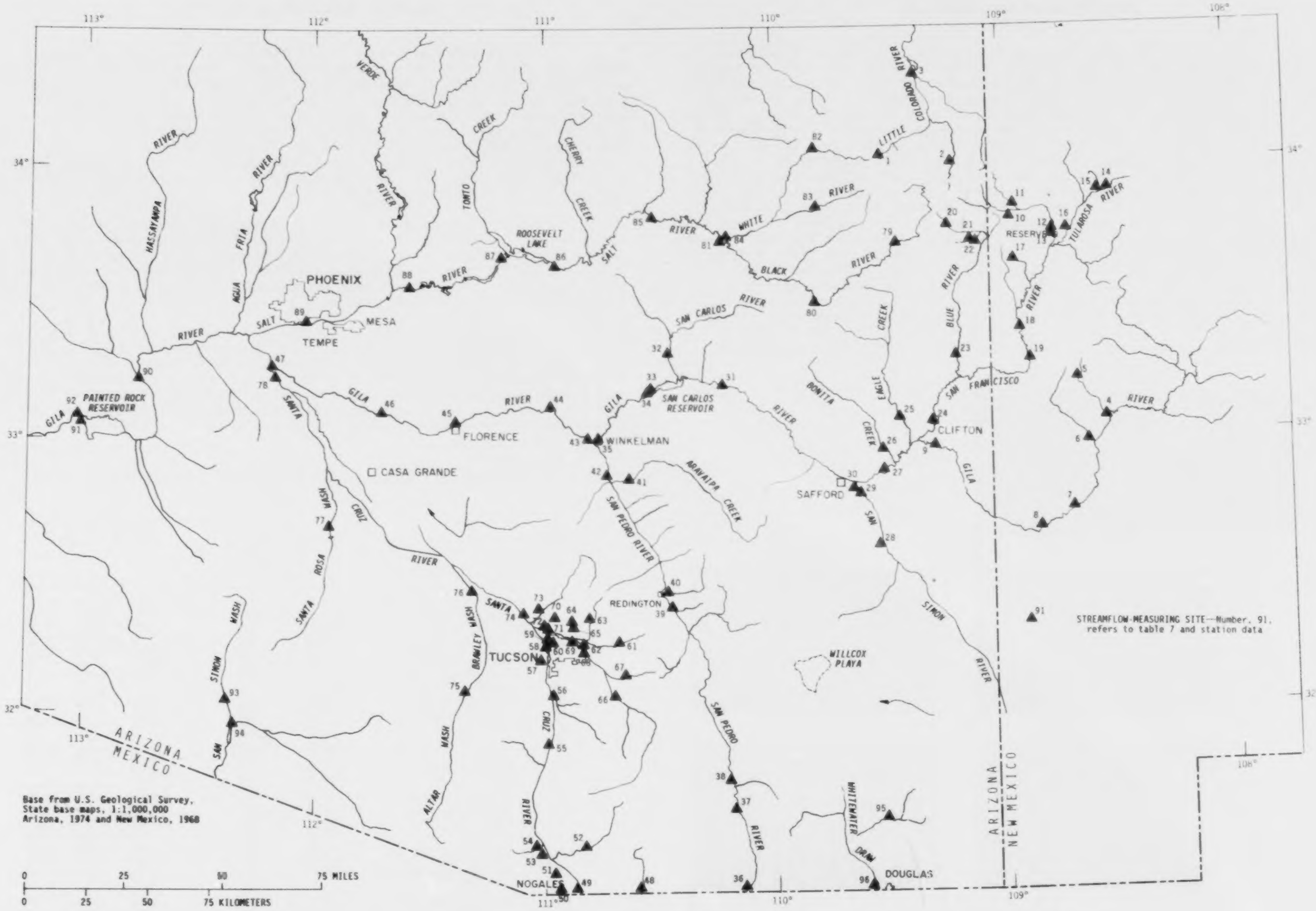


Figure 1.--Area of report.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LITTLE COLORADO RIVER
SAN CARLOS RIVER
SAN CARLOS RESERVOIR
BLUE RIVER
EAGLE CREEK
BONITA CREEK
SAN FRANCISCO RIVER
TULAROSA RIVER
GILA RIVER
PAINTED ROCK RESERVOIR
PHOENIX
MESA
TEMPE
FLORENCE
CASA GRANDE
WINKELMAN
ARAVAIPA CREEK
SAN PEDRO RIVER
SANTA ROSA WASH
SANTA CRUZ RIVER
SAN SIMON WASH
BRAWLEY WASH
ALTAR WASH
REDINGTON
TUCSON
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ARIZONA
MEXICO
NEW MEXICO
0 25 50 75 MILES
0 25 50 75 KILOMETERS

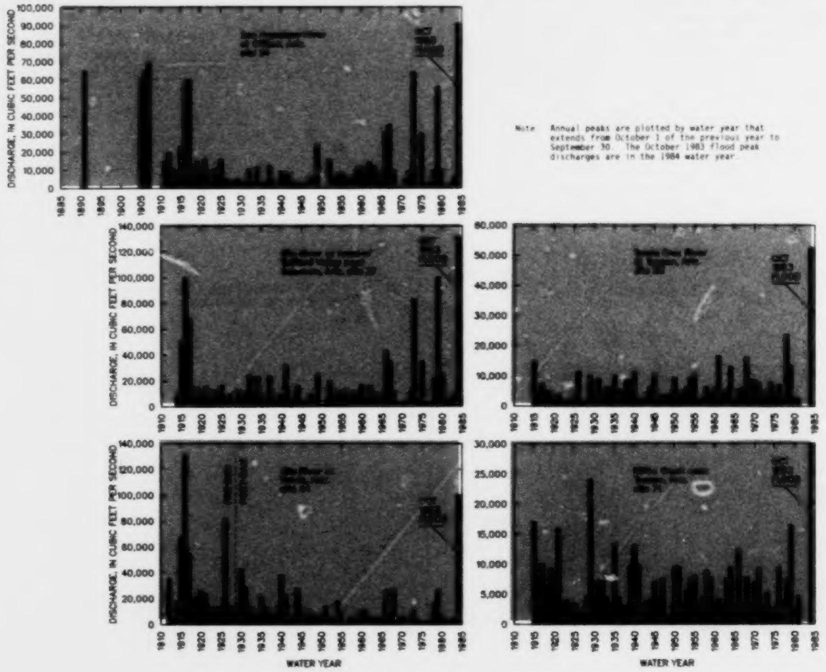
STREAMFLOW-MEASURING SITE--Number, 91, refers to table 7 and station data

Base from U.S. Geological Survey, State base maps, 1:1,000,000 Arizona, 1974 and New Mexico, 1968

Figure 2.--Streamflow-measuring sites in southeastern Arizona and western New Mexico.

Description of the Flood Area

Most of the flooding occurred in the Gila River basin in southeastern Arizona and part of western New Mexico. Flooding also occurred in basins adjacent to the Gila River such as the headwaters of the Little Colorado River and in San Simon Wash and Whitewater Draw basins that drain into Mexico. Flooding also occurred in the area that drains into the Willcox Playa. In the Gila River basin upstream from Coolidge Dam, the major source of flood runoff was the San Francisco River and other smaller tributaries that join the Gila River from the north. Major flooding on the San Francisco River occurred on October 1 and 2; most of this flood reached San Carlos Reservoir at Coolidge Dam on October 2 and 3 where it was contained by the reservoir. Downstream from Coolidge Dam, a major flood on the lower San Pedro River, much of which came from Aravaipa Creek, entered the Gila River on October 1 and 2. Floodwaters reached the confluence with the Santa Cruz River on October 4 and 5 at about the same time as floodwaters of the Santa Cruz River. Flooding in the Santa Cruz River originated mostly between Nogales and Tucson. The Salt River also contributed to the flood on the Gila River. The flood on the Salt River was not unusual except in the headwaters area, and most of this flow was regulated by the reservoirs upstream from Phoenix. Floodwaters in the Gila River reached Painted Rock Reservoir where the greatest daily rate of inflow occurred on October 6. The floodwater was contained in the reservoir and was released gradually during the next 4 months.



Note: Annual peaks are plotted by water year that extends from October 1 of the previous year to September 30. The October 1983 flood peak discharges are in the 1984 water year.

Figure 3.--Comparison of October 1983 flood peak discharges with previous annual peak discharges at five long-term gaging stations.

Relative Magnitude of the Floods

The relative magnitude of the floods was evaluated by three methods comparison with previous maximum discharges, flood-frequency relations, an comparison with previous flood-runoff volumes. The peak discharges exceeded th previous maxima at 37 gaging stations in the flood area. Some of the station have relatively short records, but of the 37 stations, 20 have records of 3 years or more (See section entitled "Streamflow Data at Gaging Stations an Miscellaneous Measuring Sites," table 7). The peak discharges at four of fiv long-term gaging stations were the largest during periods of record dating bac to at least 1915 (fig. 3). The peak discharge at the Gila River at Kelvin gagir station was the largest since 1916.

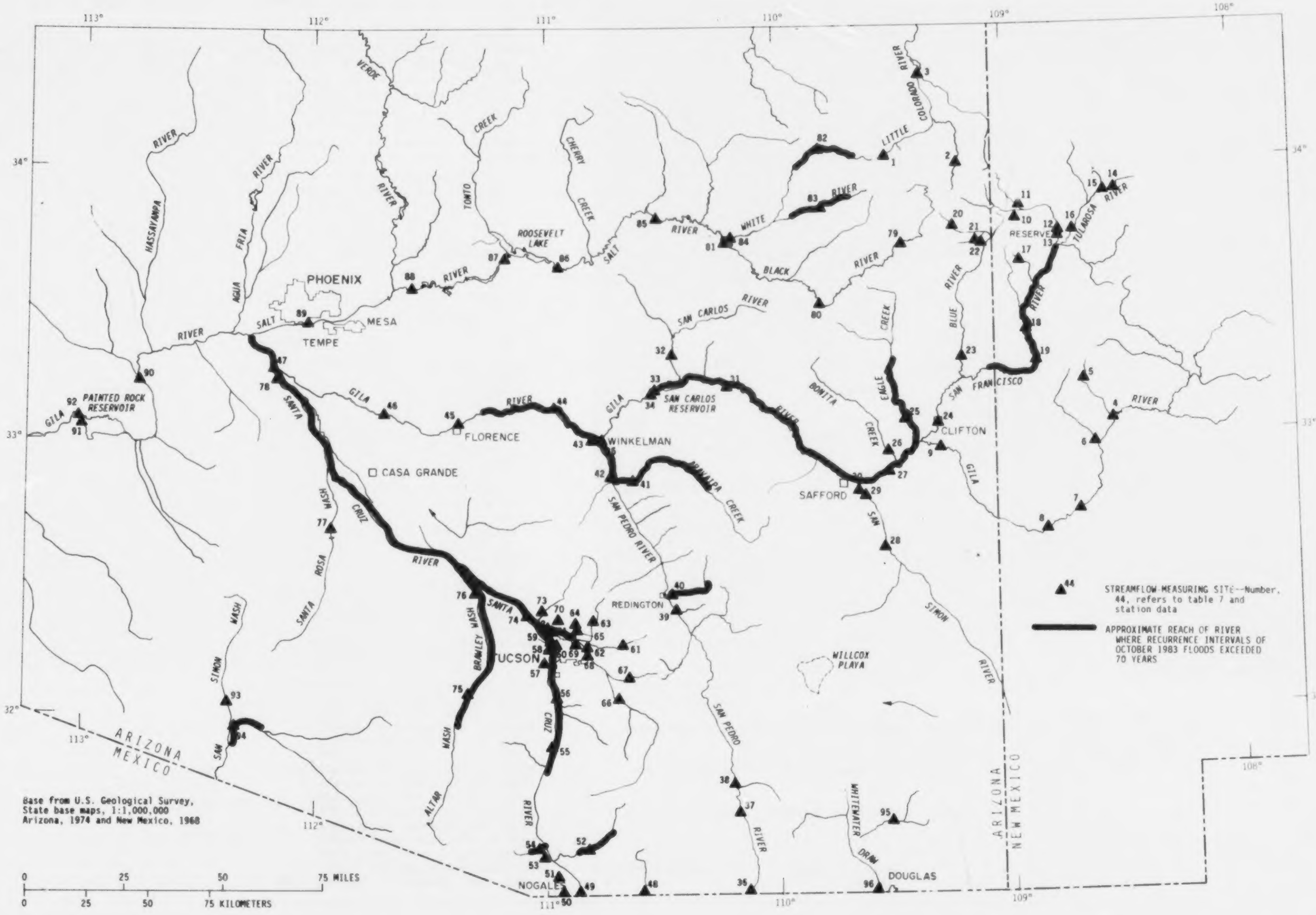
Flood frequency is commonly expressed in terms of the recurrenc interval of a flood, such as a 50-year or 100-year flood. The recurrenc intervals of the floods were greater than 100 years at 9 gaging stations and we greater than 70 years at 19 gaging stations. The approximate reaches of rive where the recurrence intervals were greater than 70 years are shown in figure (See section entitled "Flood Frequency").

Because of the long duration of the storm over a large area, t floods set records for volume of runoff as well as for magnitudes of pe discharges. In order to compare flood-runoff volumes, mean discharges for 1, and 7 consecutive days during the flood period were compared with previc maxima. Only gaging stations that have daily discharge records of 30 years more were used in the comparison. Mean discharges during the flood period we higher than the previous maxima at the 13 gaging stations shown in table 1.

Table 1.--Highest mean discharges for 1, 3, and 7 consecutive days at gaging stations with 30 or more years of record and where mean discharges were new maxima during September 27 to October 3, 1983

Location number (See fig. 2 and table 7)	Station name	Period of record	Calendar year	Rank	Highest mean discharge, in cubic feet per second for number of consecutive days		
					1	3	7
19	San Francisco River near Glenwood, N. Mex.	1928-83	1983	1	27,500	17,600	8,890
			1972	2	17,500	8,700	4,280
24	San Francisco River at Clifton, Ariz.	1914-17, 1928-83	1983	1	52,200	38,000	19,100
			1972	2	34,500	19,100	9,390
25	Eagle Creek above pumping plant, near Morenci, Ariz.	1945-83	1983	1	16,000	10,700	5,000
			1978	2	9,680	6,620	3,630
27	Gila River at head of Safford Valley, near Solomon, Ariz.	1933, 1936-83	1983	1	90,000	59,700	31,000
			1978	2	62,700	40,800	21,700
31	Gila River at Calva, Ariz.	1930-83	1983	1	90,000	69,100	34,100
			1978	2	67,400	41,700	21,400
41	Aravaipa Creek near Mammoth, Ariz.	1920-21, 1932-42, 1967-83	1983	1	16,000	10,900	4,780
			1978	2	6,400	4,130	2,010
44	Gila River near Kelvin, Ariz.	[1]1929-83	1983	1	50,000	25,000	12,800
			1978	2	20,400	11,600	6,100
47	Gila River near Laveen, Ariz.	1941-46, 1949-83	1983	1	28,000	19,000	9,510
			1941	2	8,700	------	------
			1978	2	------	4,590	2,710
55	Santa Cruz River at Continental, Ariz.	1941-46, 1952-83	1983	1	17,800	10,700	6,200
			1977	2	13,200	7,240	3,330
58	Santa Cruz River at Tucson, Ariz.	1906, 1913 1915-81	1983	1	27,300	16,600	------
			1977	2	11,200	------	------
			1914	2	------	6,970	3,830
71	Rillito Creek near Tucson, Ariz.	[2]1914, 1916-75	1983	1	11,900	8,070	------
			1921	2	4,920	4,010	2,250
78	Santa Cruz River near Laveen, Ariz.	1941-83	1983	1	18,000	15,500	7,790
			1962	2	5,820	------	------
			1946	2	------	4,270	2,410
82	North Fork White River near McNary, Ariz.	1946, 1951-54, 1958-83	1983	1	1,480	1,090	729
			1978	2	1,000	------	------
			1973	2	------	746	------
			1958	2	------	------	571

[1] Regulated.
[2] Discharges of December 1978 may have been higher.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TUCSON
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PAINTED ROCK RESERVOIR
ROOSEVELT LAKE
SAN CARLOS RESERVOIR
WILLCOX PLAYA
ARIZONA
MEXICO
ARIZONA
NEW MEXICO
GILA RIVER
SALT RIVER
VERDE RIVER
HASSAYAMPA RIVER
AGUA FRIA RIVER
TONTO CREEK
CHERRY CREEK
WHITE RIVER
BLACK RIVER
LITTLE COLORADO RIVER
SAN CARLOS RIVER
BONITA CREEK
EAGLE CREEK
BLUE RIVER
SAN FRANCISCO RIVER
TULAROSA RIVER
SAN SIMON RIVER
SAN PEDRO RIVER
ARAVAIPA CREEK
SANTA CRUZ RIVER
SANTA ROSA WASH
SAN SIMON WASH
BRAWLEY WASH
ALTAR WASH
WHITEWATER DRAW
STREAMFLOW MEASURING SITE--Number, 44, refers to table 7 and station data
APPROXIMATE REACH OF RIVER WHERE RECURRENCE INTERVALS OF OCTOBER 1983 FLOODS EXCEEDED 70 YEARS
0 25 50 75 MILES
0 25 50 75 KILOMETERS

Base from U.S. Geological Survey, State base maps, 1:1,000,000
Arizona, 1974 and New Mexico, 1968

Figure 4.--Rivers where recurrence intervals of October 1983 floods exceeded 70 years.

Interaction of a high-altitude low-pressure trough that provided lifting of air and a persistent supply of moist tropical air climaxed by the influx of moisture associated with a tropical storm led to the long period of rainfall from September 27 to October 3, 1983. The high-altitude low-pressure trough situated off the coast of California was bringing moist tropical air into Arizona from the southwest on September 27. On September 28, the trough intensified increasing the flow of tropical moisture into the State. Meanwhile, tropical storm Octave, in the eastern North Pacific Ocean, was turning northward (fig. 5) under the influence of the low-pressure trough (Gunther and Cross, 1984). On September 29, Octave curved to the northeast, and by September 30 moisture from Octave was flowing into southeastern Arizona. The flow of moisture increased on October 1 (fig. 6) and slowly began to diminish on October 2 as Octave was dissipating off the west coast of Baja California. Weather maps for the storm period, September 26 to October 3, 1983, are shown in Saarinen and others (1984).

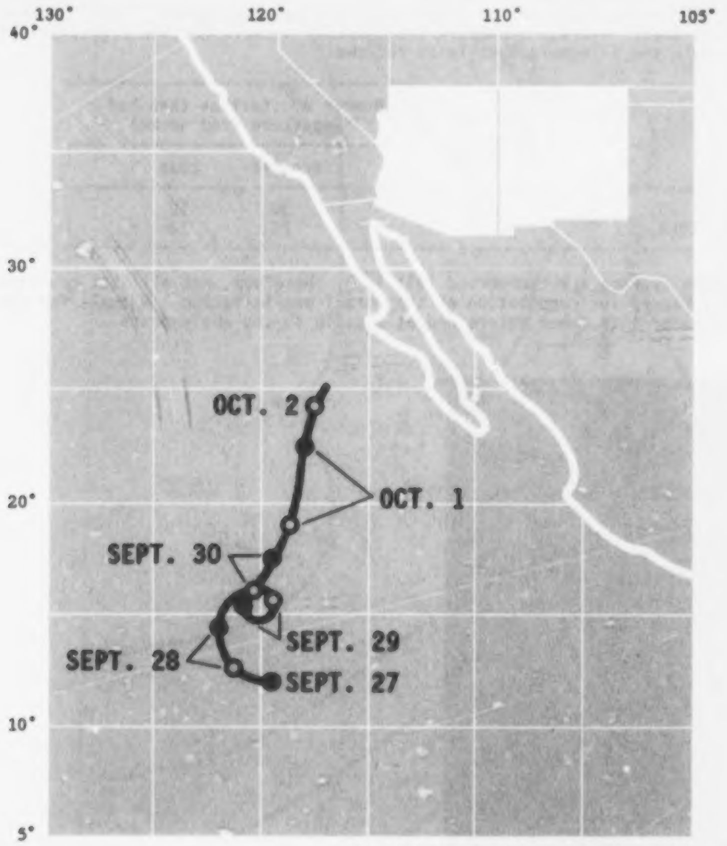
Some of the greatest general rainfall and the most severe floods in Arizona have resulted from tropical cyclones, which include tropical storms and hurricanes, that originated in the eastern North Pacific Ocean (table 2). Since 1962, 11 floods in Arizona have resulted from tropical cyclones; six of the floods have been in parts of southeastern Arizona—1962, 1964, 1970, 1972, 1977, and 1983. From 1926 to 1962, only five floods in Arizona resulted from tropical cyclones; however, documentation before 1954 is difficult because no complete published records of tropical cyclones are available (Eidemiller, 1978). Some tropical cyclones may have gone undetected as late as 1966 when complete satellite coverage of the eastern north Pacific Ocean became available.

Table 2.--Summary of major floods in Arizona that have resulted from tropical cyclones

[Adapted from Smith, 1986]

Date of flood	Storm type[1]	Area of flood	Reference
Sept. 26-27, 1926	Tropical cyclone	Central and southeastern Arizona	Brazel and Evans, 1984; Hoyt and Langbein, 1955
Sept. 3-7, 1939	Hurricane	Northwestern Arizona	Gatewood, 1945; Brazel and Evans, 1984; Hansen and Schwarz, 1981
Sept. 8-13, 1939	Tropical cyclone	Northwestern Arizona	Gatewood, 1945; Brazel and Evans, 1984
Sept. 28-29, 1941	Tropical cyclone	Southeastern Arizona	Sellers, 1985; Brazel and Evans, 1984
Aug. 26-30, 1951	Tropical storm	Central and western Arizona	U.S. Weather Bureau, 1951; Brazel and Evans, 1984 National Environmental Satellite Data
Sept. 26-28, 1962	Tropical storm Claudia	Southern Arizona	National Environmental Satellite Data and Information Service, 1962; Lewis, 1968
Sept. 17, 1963	Tropical storm Katherine	Southwestern Arizona	Aldridge, 1968; Brazel and Evans, 1984
Sept. 9-11, 1964	Tropical storm Tillie	Santa Cruz River basin, southern Arizona	Aldridge, 1970
Sept. 2-5, 1967	Hurricane Katrina	Western Arizona	Werho, 1972; Brazel and Evans, 1984
Sept. 4-6, 1970	Tropical storm Norma	Central, southern, and northeastern Arizona	Roeske, 1978; National Environmental Satellite Data and Information Service, 1970
Sept. 29-30, 1971	Hurricane Olivia	Northeastern Arizona	National Environmental Satellite Data and Information Service, 1971; Sellers, 1985
Oct. 3-7, 1972	Hurricane Joanne	Southern, central, and eastern Arizona	National Environmental Satellite Data and Information Service, 1972; Brazel and Evans, 1984
Sept. 10-11, 1976	Hurricane Kathleen	Western Arizona	National Environmental Satellite Data and Information Service, 1976; Brazel and Evans, 1984
Aug. 14-17, 1977	Hurricane Doreen	Western Arizona	National Environmental Satellite Data and Information Service, 1977a; Brazel and Evans, 1984
Oct. 6-10, 1977	Hurricane Heather	Southern Arizona	National Environmental Satellite Data and Information Service, 1977b; Aldridge and Eychaner, 1984; Brazel and Evans, 1984
Sept 29- Oct. 3, 1983	Tropical storm Octave	Southeastern Arizona	National Environmental Satellite Data and Information Service, 1983

[1] Tropical cyclone is a general term encompassing hurricanes and tropical storms. No distinction was made in some cases whether the cyclone was a hurricane or a tropical storm. A cyclone is classified as a tropical storm when maximum sustained winds are between 40 and 74 miles per hour. When maximum sustained winds are 75 miles per hour or more, the cyclone is classified as a hurricane (Huschke, 1959).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(Adapted from National Environmental Satellite Data and Information Service, 1983i)

EXPLANATION

○ STORM POSITION, 0500 HOURS

● STORM POSITION, 1700 HOURS

Figure 5.--Track of tropical storm Octave, September-October 1983.

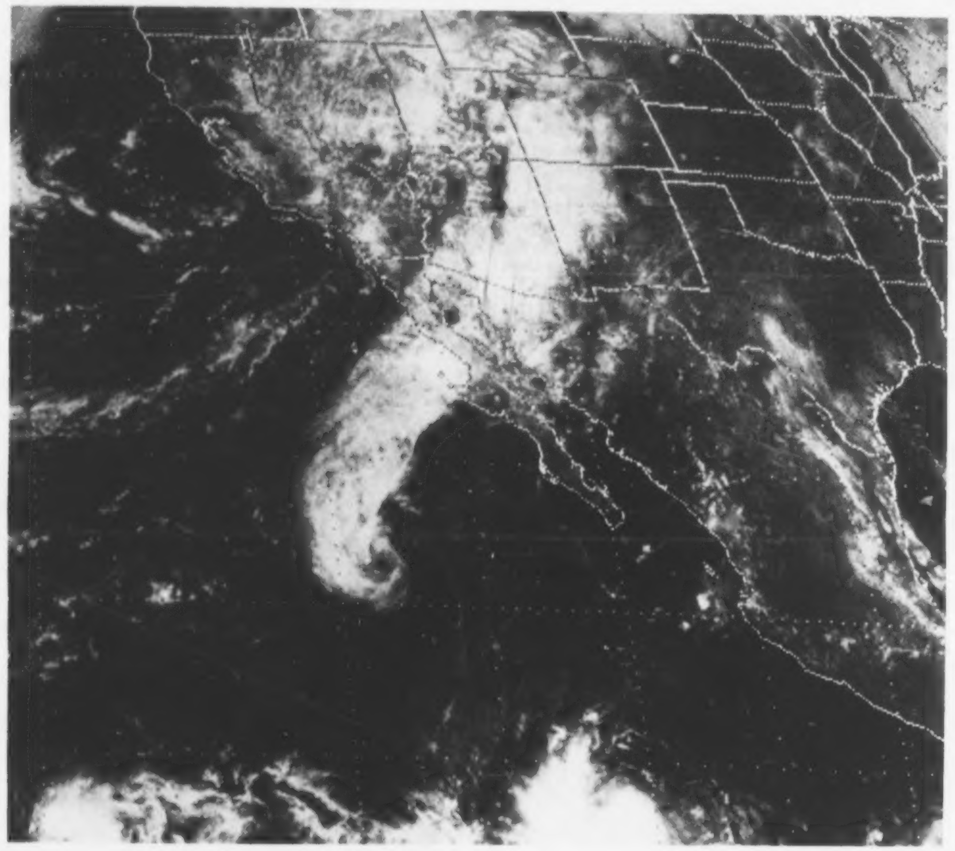

Figure 6.--Geostationary Operational Environmental Satellite (GOES) photograph of tropical storm Octave and associated moisture at 1145 hours m.s.t., October 1, 1983. Photograph from National Environmental Satellite Data and Information Service.

Rainfall

Maximum rainfall measured for the 7-day storm period was 11.30 in. on the Blue River 17 mi northeast of Clifton, Ariz., at an elevation[1] of 4,160 ft (fig. 7). The next greatest total was 10.49 in. at an elevation of 7,000 ft in the Santa Catalina Mountains just north of Tucson. Some mountain areas may have received greater rainfall than shown on the map because of the orographic nature of the storm and the lack of precipitation gages in the mountains. Precipitation data are listed in Appendix A. The greatest single-day rainfall during the storm period occurred on October 1 at most of the precipitation stations, and the greatest 24-hour rainfall occurred between the early hours of October 1 and the early hours of October 2 (fig. 8). In the 4 days before the intense rain on October 1, most stations received more than 2 in. of rain.

Before the storm period began, rainfall had been above normal in most of the study area. Average departure from monthly normals for the precipitation stations within the 5-inch isohyet is as follows:

Date	Average departure, in inches	Number of stations that had departure from normal	
		Greater	Less
Aug. 1983..........	+0.74	30	10
Sept. 1-26, 1983...	+0.62	29	12

Normal is the average for the period 1951-1980; therefore, not all stations have a sufficient record for computation of the normal precipitation. Normals for the period, September 1-26, were determined as a ratio to the whole month.

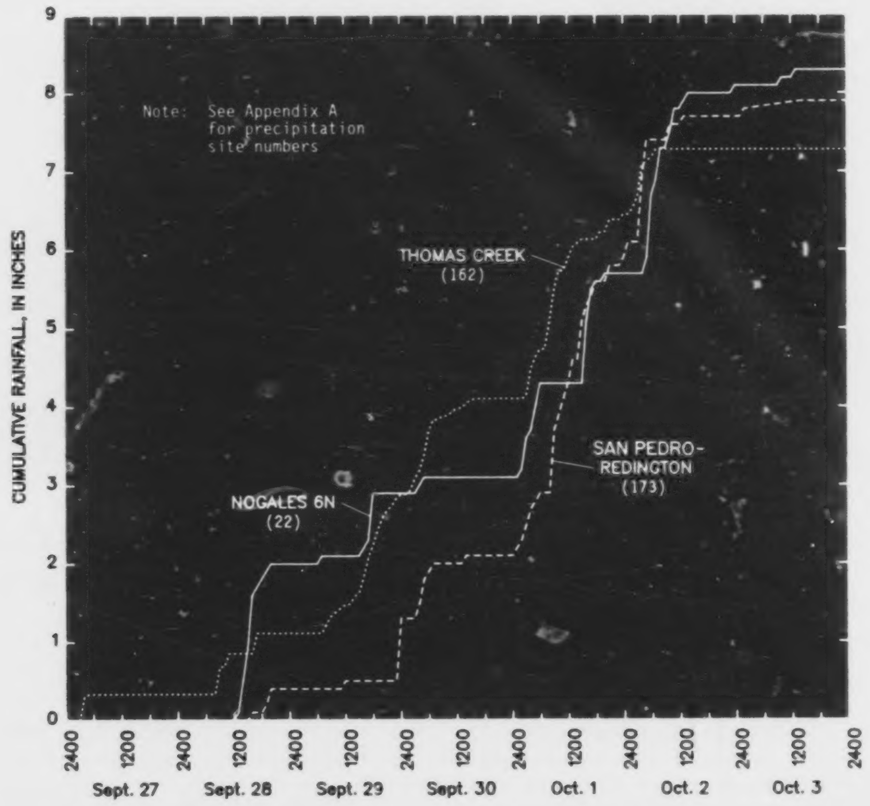

Figure 8.--Cumulative rainfall at three precipitation stations in southeastern Arizona, September 27 to October 3, 1983.

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[1] Elevation refers to altitude above mean sea level.

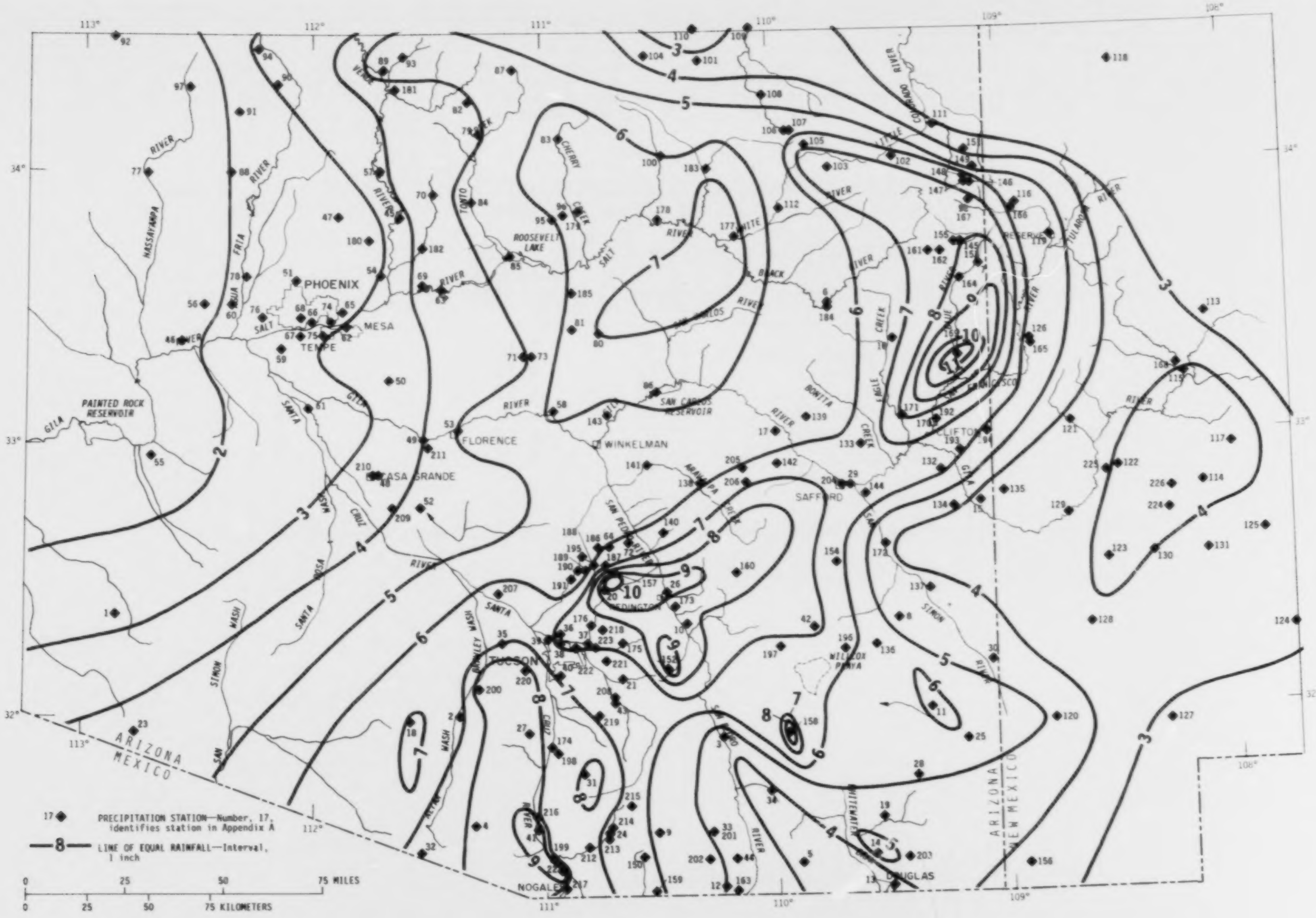

113°
112°
111°
110°
109°
108°
34°
33°
32°
PHOENIX
MESA
TEMPE
FLORENCE
CASA GRANDE
WINKELMAN
SAFFORD
CLIFTON
TUCSON
NOGALES
DOUGLAS
PAINTED ROCK RESERVOIR
ROOSEVELT LAKE
SAN CARLOS RESERVOIR
GILA RIVER
SALT RIVER
VERDE RIVER
HASSAYAMPA RIVER
AGUA FRIA RIVER
SANTA CRUZ RIVER
SAN PEDRO RIVER
SAN CARLOS RIVER
BLACK RIVER
WHITE RIVER
BONITA CREEK
EAGLE CREEK
SAN FRANCISCO
SAN SIMON
TULAROSA RIVER
CHERRY CREEK
TONTO CREEK
WILLCOX PLAYA
ARIZONA
MEXICO
ARIZONA
NEW MEXICO
2
3
4
5
6
7
8
9
10
17 ◆ PRECIPITATION STATION—Number, 17, identifies station in Appendix A
—8— LINE OF EQUAL RAINFALL—Interval, 1 inch
0 25 50 75 MILES
0 25 50 75 KILOMETERS

Figure 7.--Total rainfall in southeastern Arizona and western New Mexico, September 27 to October 3, 1983.

Rainfall during the storm period, September 27 to October 3, contributed to the highest annual precipitation and the highest September-October seasonal precipitation at many of the precipitation stations in the study area. Rainfall during September-October 1983 was the highest for the period of record at three long-term precipitation stations (fig. 9). The previous September-October high occurred in 1972 at the Clifton and Tucson (University of Arizona) stations and in 1977 at the Nogales station. Hurricanes in October 1972 and October 1977 contributed to the high seasonal rainfalls in those years.

Observation-day rainfall equaled or exceeded the 100-year, 24-hour precipitation (table 3) at only three stations (Miller and others, 1973). The 100-year, 24-hour precipitation is the amount of precipitation in a 24-hour period that will be equaled or exceeded during a long period of time on the average of once every 100 years. Outstanding floods occurred on rivers with large drainage areas because steady rain had fallen in the study area for several days and the most intense rain fell after the ground was saturated and after runoff had begun.

Table 3.--Comparison of maximum observation-day rainfall with the 100-year, 24-hour precipitation records at selected sites, September 27 to October 3, 1983

Site number (See Appendix A)	Station name	Date	Rainfall, in inches	Precipitation, 100-year 24-hours, in inches
20	Mt. Lemmon.........	10-01	5.10	5.0
18	Kitt Peak..........	10-02	4.70	5.5
7	Blue River.........	10-01	4.53	4.0
157	Oracle Ridge Mine..	10-01	4.30	5.0
40	Tucson, University	10-01	4.16	4.6
	of Arizona........	10-01	4.16	4.6
173	San Pedro River at Redington......	10-01	3.80	3.8

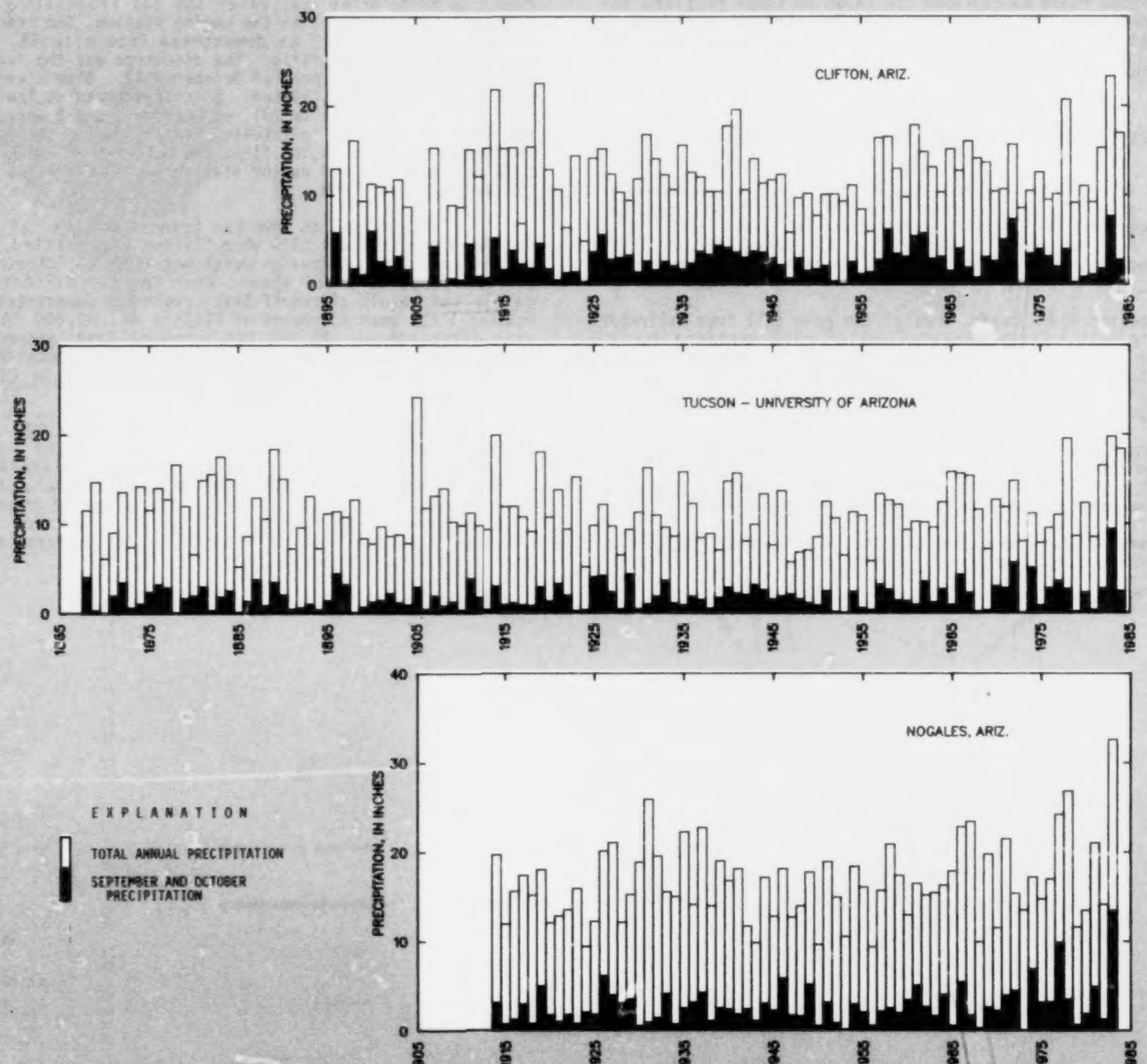


Figure 9.--Comparison of September-October precipitation with annual precipitation at three long-term precipitation stations in southeastern Arizona.

In the following four sections, the floods are described by subbasins of the Gila River basin. Some flood hydrographs are shown in these sections for comparison purposes. Hydrographs for all recording gaging stations are shown in the Station Data section at the end of the report. Detailed hydrograph data are in Appendix A.

San Francisco River and Gila River above Coolidge Dam

San Francisco River, which joins the Gila River 7 mi southwest of Clifton, Ariz., was the major source of flood runoff above Coolidge Dam (fig. 10). Peak discharges were the largest recorded at four gaging stations on the San Francisco River from Reserve, N. Mex. (site 12), to Clifton, Ariz. (site 24). The recurrence interval of the flood was 70 years or greater at the four gaging stations.

In the San Francisco River basin, most of the rain fell from September 29 to October 2, 1983, (fig. 11). The greatest amount of rain measured during that period was 10.79 in. at Blue River near Clifton, Ariz. Intense rainfall during the mornings of October 1 and 2 led to flood peaks on those 2 days at all the recording gaging stations in the basin except Tularosa River above Aragon, N. Mex. (site 14), where just one peak occurred.

At the uppermost gaging station, San Francisco River near Reserve, N. Mex. (site 12), flood peaks occurred on September 30, October 1, and October 2. The peak of 9,830 ft³/s on October 1 was the largest of the three peaks and was 1.4 times the previous maximum recorded in October 1972.

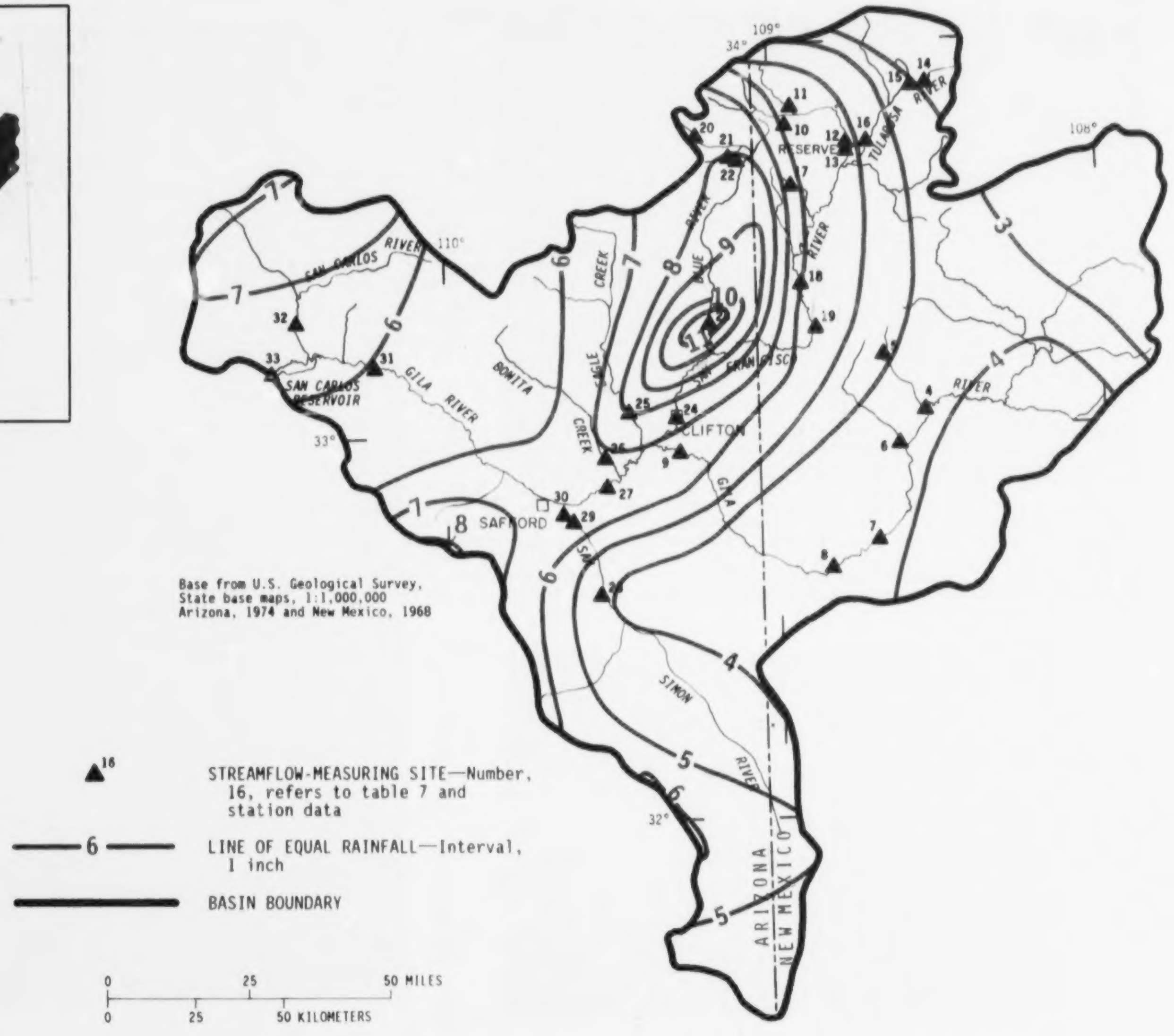
Forty miles downstream at the gaging station, San Francisco River near Alma, N. Mex. (site 18), the peak discharge increased to 56,600 ft³/s, which was 1.8 times the previous maximum of October 1972. Most of the increase probably came from tributaries that enter the San Francisco River from the west where rainfall was greater. At the gaging station, San Francisco River near Glenwood, N. Mex. (site 19), 12 mi downstream from site 18, the peak discharge had attenuated to 37,100 ft³/s. The discharge was the largest in 56 years of record and was 1.5 times the peak of October 1972. Blue River joins San Francisco River 21.6 mi upstream from Clifton. Discharge peaks at the gaging station, Blue River near Clifton, Ariz. (site 23), on October 1 and 2 were of nearly equal magnitude and were in response to intense rainfall during the mornings of October 1 and 2. The larger peak was 24,300 ft³/s and occurred at 1300 hours on October 1. The peak of record at the gaging station was 30,000 ft³/s in October 1972, which was the largest since 1885.

The flood on the San Francisco River at Clifton (site 24) was the largest since at least 1870 when Clifton was settled. The storm produced two discharge peaks of nearly equal magnitude on October 1 and 2. H.W. Hjalmarson (written commun., 1986) showed that the two discharge peaks at Clifton were mainly the result of runoff that originated downstream from sites 19 and 23. On October 1 the peak discharge at Clifton was 89,600 ft³/s. On October 2, the peak discharge was 90,900 ft³/s. Both peaks exceeded the previous maximum of 70,000 ft³/s, which occurred in December 1906. Details of timing and sources of flood peaks and historical flood records in Clifton are discussed by H.W. Hjalmarson (written commun, 1986).

Total runoff at site 24 was 262,000 acre-ft for the period September 30 to October 5, which is an average of 1.8 in. of runoff over the 2,766-square-mile drainage area. Average rainfall on the drainage area was 6.3 in. as measured from the lines of equal rainfall (fig. 10); therefore, about 29 percent of the rain that fell in the basin became runoff that flowed past site 24 in the 6-day period. At least 36 percent of the runoff at site 24 originated in the lower 22 percent of the drainage area, which is the drainage area below sites 19 and 23.

Index map showing location of subbasin.

Station name	Site number
Gila River near Gila, N. Mex.	4
Mogollon Creek near Cliff, N. Mex.	5
Duck Creek at Cliff, N. Mex.	6
Gila River near Redrock, N. Mex.	7
Gila River below Blue Creek, near Virden, N. Mex.	8
Gila River near Clifton, Ariz.	9
Mail Hollow near Luna, N. Mex.	10
Trout Creek at Luna, N. Mex.	11
San Francisco River near Reserve, N. Mex.	12
S.U. Canyon at New Mexico Highway 12, near Reserve, N. Mex.	13
Tularosa River above Aragon, N. Mex.	14
Negro Canyon at Aragon, N. Mex.	15
Tularosa River near Reserve, N. Mex.	16
Cottonwood Canyon at U.S. Highway 180, near Reserve, N. Mex.	17
San Franciso River near Alma, N. Mex.	18
San Francisco River near Glenwood, N. Mex.	19
Campbell Blue Creek near Alpine, Ariz.	20
East Fork Castle Creek near Alpine, Ariz.	21
West Fork Castle Creek near Alpine, Ariz.	22
Blue River near Clifton, Ariz.	23
San Francisco River at Clifton, Ariz.	24
Eagle Creek above pumping plant, near Morenci, Ariz.	25
Bonita Creek near Morenci, Ariz.	26
Gila River at head of Safford Valley, near Solomon, Ariz.	27
San Simon River at Tanque, Ariz.	28
San Simon River at barrier detention dam, near Solomon, Ariz.	29
San Simon River near Solomon, Ariz.	30
Gila River at Calva, Ariz.	31
San Carlos River near Peridot, Ariz.	32
San Carlos Reservoir at Coolidge Dam, Ariz.	33


109°
34°
108°
110°
33°
32°
RESERVE
CLIFTON
SAFFORD
SAN CARLOS RIVER
SAN CARLOS RESERVOIR
GILA RIVER
BONITA
EAGLE CREEK
BLUE RIVER
SAN FRANCISCO RIVER
TULAROSA RIVER
GILA RIVER
SAN SIMON RIVER
ARIZONA
NEW MEXICO
3
4
5
6
7
8
9
10
11
STREAMFLOW-MEASURING SITE—Number, 16, refers to table 7 and station data
LINE OF EQUAL RAINFALL—Interval, 1 inch
BASIN BOUNDARY
0 25 50 MILES
0 25 50 KILOMETERS

Base from U.S. Geological Survey, State base maps, 1:1,000,000 Arizona, 1974 and New Mexico, 1968

Figure 10.--Total storm rainfall, September 27 to October 3, 1983, and streamflow-measuring sites in San Francisco River basin and Gila River basin above Coolidge Dam.

San Francisco River and Gila River above Coolidge Dam--Continued

Flooding on the Gila River upstream from San Francisco River was minor compared to the flooding on San Francisco River. Peak discharge at Gila River near Clifton (site 9), 6 mi upstream from the San Francisco River, was only 15,300 ft^3/s. Much of the upper Gila River drainage area received less than 4 in. of rain during the storm period, and discharge hydrographs indicate that the most intense rain fell during the morning of October 2. Peak discharge at Gila River near Redrock, N. Mex. (site 7), occurred at 1530 hours on October 2, 6 hours earlier than the peak discharge at Gila River near Gila, N. Mex. (site 4), 33 mi upstream. The flood peak can be followed downstream from site 7 to site 9 (fig. 12). From site 7 to site 8, a distance of 16 mi, the traveltime of the peak was 3 hours. From site 8 to site 9, a distance of 52 mi, the traveltime was 26 hours. As the flood moved downstream, the peak discharge attenuated from 24,800 ft^3/s at site 7 to 15,500 ft^3/s at site 8 to 12,700 ft^3/s at site 9. At site 9, this discharge was exceeded by the peak discharge of 15,300 ft^3/s at 1030 hours on October 2 that resulted from local runoff. Total runoff in the Gila River at site 9 for the period September 30 to October 5 was 51,700 acre-ft, which is 20 percent of the runoff in the San Francisco River at site 24 for the same period.

The peak of 90,900 ft^3/s on October 2 on the San Francisco River probably reached the Gila River slightly before the arrival of the peak of 15,300 ft^3/s that was coming down the Gila River. In the 17-mile reach between the mouth of the San Francisco River and site 27 at the head of Safford Valley, inflow from Eagle Creek and Bonita Creek, which are the two major tributaries in the reach, increased the peak discharge of the Gila River to 132,000 ft^3/s at the head of Safford Valley. The peak discharge of 36,400 ft^3/s at Eagle Creek (site 25) was 1.5 times greater than the peak of December 1978 and probably was the largest discharge since at least 1916. At Bonita Creek (site 26) where record began in 1981, the peak discharge was 19,400 ft^3/s. The timing of the peaks on the two tributaries is not known, but both peaks probably occurred during the morning of October 2.

On October 2, the peak discharge at site 27 was the largest since at least 1906. The time of the peak is not known precisely because the gaging station was out of operation as a result of a rock slide on September 29. The time, however, is estimated to be between 1300 and 1400 hours on the basis of a traveltime of 3 to 4 hours from site 24 to site 27 (Aldridge and Hales, 1984). Peak discharge on the Gila River continued to increase as the flood moved downstream even though a major tributary, the San Simon River that has a drainage area of 2,192 mi^2 (site 30), contributed little runoff. Inflow from smaller tributaries that drain the nearby mountains increased the peak discharge of the Gila River to 150,000 ft^3/s at Gila River at Calva (site 31) at the head of San Carlos Reservoir. The discharge was the largest at this site since at least 1906. At site 31, the recorder did not operate from 0900 hours on October 2 to 0900 hours on October 3, and record for this period was estimated from adjoining good record, a high-water mark of the peak, and flow routing. On the basis of a flow-routing model, the peak of October 1 at site 24 traveled the 93 mi to site 31 in 18.75 hours (fig. 13); the peak of October 2 traveled the same distance in 17.25 hours.

The contents of San Carlos Reservoir (site 33) were 547,000 acre-ft on September 27 before runoff began. On October 4 at 1330 hours, water began to flow over the spillway at Coolidge Dam as the contents of the reservoir reached 937,000 acre-ft. On October 7, the contents reached 967,000 acre-ft, which is the maximum storage for this flood. Inflow to the reservoir for the period September 28 to October 7 was 448,000 acre-ft on the basis of change in reservoir contents and spill and release from the reservoir. Inflow for the same period computed from discharge data for sites 31 and 32 and an estimate of discharge for 390 mi^2 of ungaged drainage area was 525,000 acre-ft, which is 17 percent larger than the change-in-contents figure for the reservoir. The spill of October 1983 from San Carlos Reservoir was the third spill since Coolidge Dam was completed in 1928. Previous spills occurred in 1979 and 1980[2].

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[2] A fourth spill occurred in 1985.

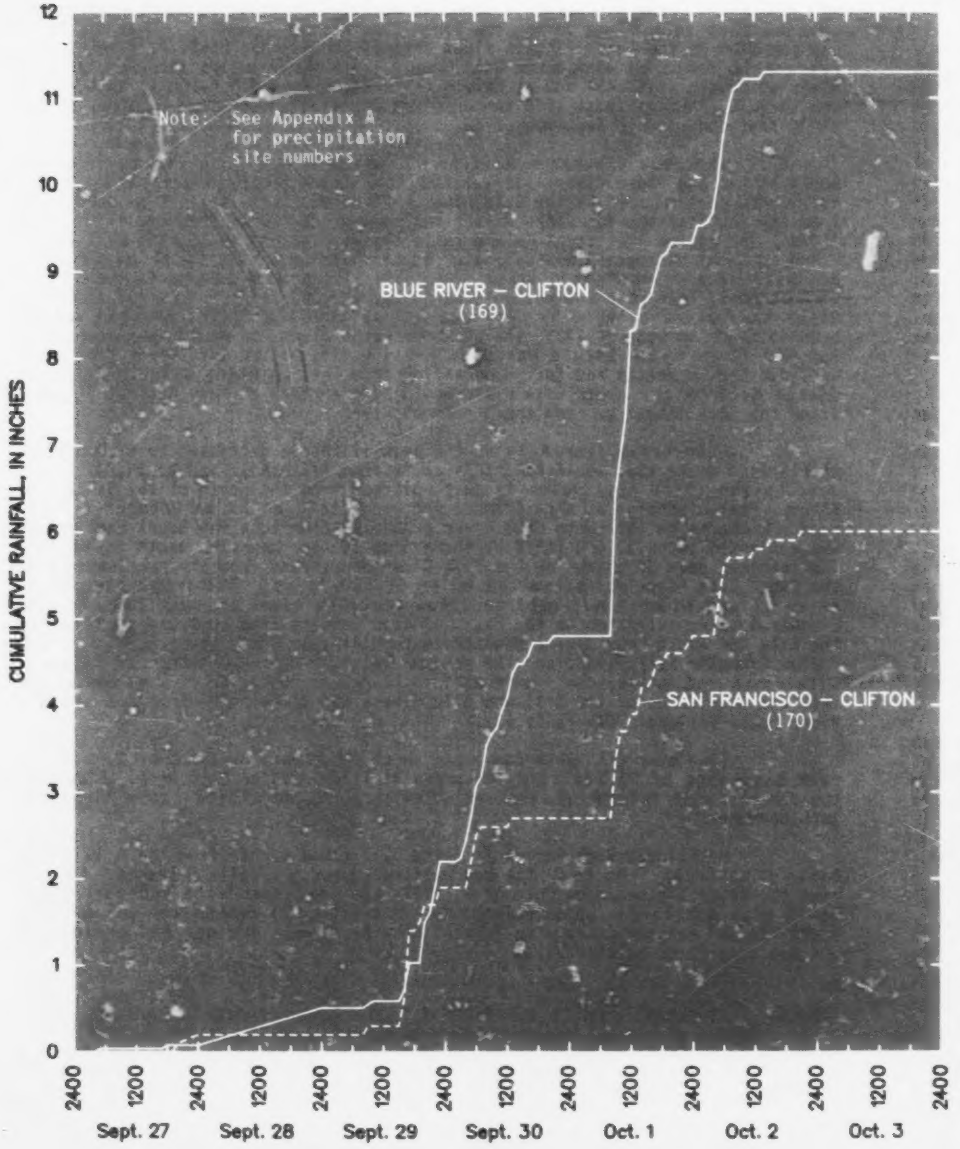


Figure 11.--Cumulative rainfall at two precipitation stations in the San Francisco River basin, September 27 to October 3, 1983.

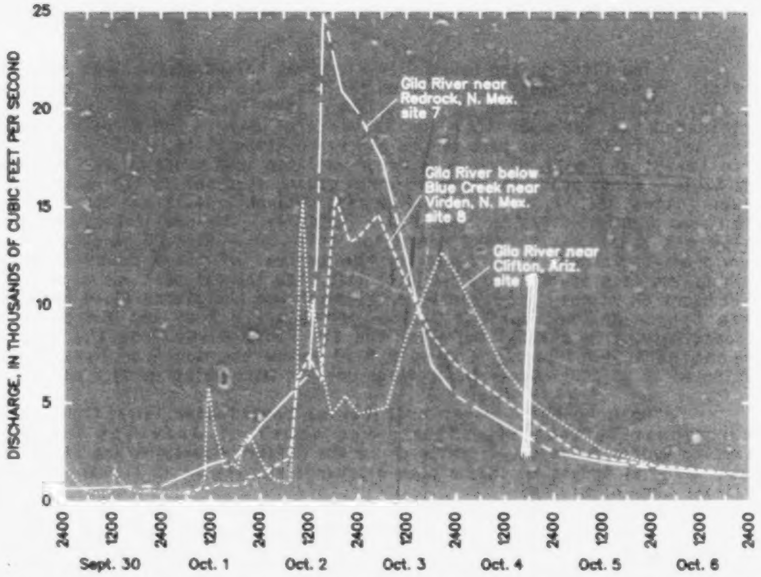


Figure 12.--Discharge of the Gila River at three gaging stations upstream from the San Francisco River in Arizona and New Mexico, September 30 to October 6, 1983.

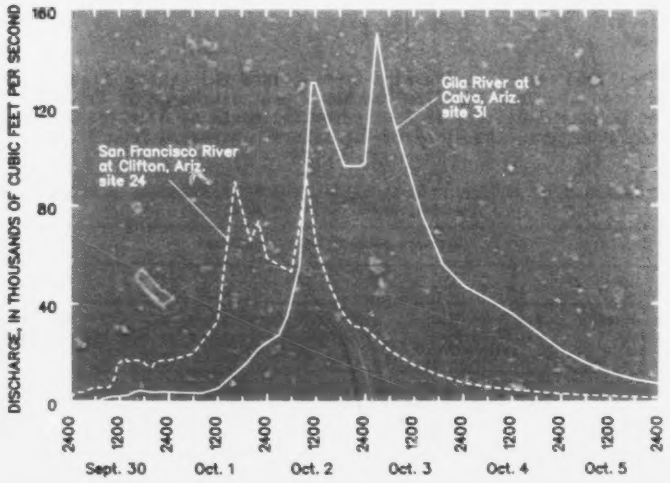


Figure 13.--Discharge of the San Francisco River at Clifton and Gila River at Calva, Ariz., September 30 to October 5, 1983.

San Pedro River and Gila River from Coolidge Dam to Painted Rock Dam

The flood on the upper Gila River was halted at Coolidge Dam; however, a flood of nearly equal magnitude on the San Pedro River entered the Gila River at Winkelman, 31 mi below Coolidge Dam. The flood on the San Pedro River originated in the lower half of the basin mainly in the Aravaipa Creek basin (fig. 14). In the upper part of the San Pedro River basin, flood peaks generally were small, and peak discharges occurred later than those in the lower part of the basin. Flood peaks recorded at three gaging stations on the upper San Pedro River (sites 36, 37, and 38) provide some data on traveltimes for discharges in the range of 6,600 ft^3/s to 8,600 ft^3/s (table 4). One peak can be followed from Palominas (site 36) to near Redington (site 39). Streamflow data for site 39 show peaks on October 1 and 2 marking the arrival of flood peaks from various tributaries (see Station Data for site 39). The largest peak was 25,400 ft^3/s at 0630 hours on October 2. Field observation showed that large flows had come from Soza Canyon and Hot Springs Canyon, which are 2.7 mi and 9.4 mi upstream, respectively, from site 39 and enter the San Pedro River from the east. Peak discharge in Hot Springs Canyon 0.8 mi below the mouth of Bass Canyon was estimated at 20,000 ft^3/s; the drainage area at this point is 99.2 mi^2.

On October 1, other tributaries contributed large flows to the San Pedro River between site 39 and the mouth of Aravaipa Creek. For example, Redfield Canyon, which heads in the Galiuro Mountains and enters the San Pedro River at Redington, had a peak discharge at site 40 of 17,600 ft^3/s from a drainage area of 61.2 mi^2.

Rainfall on parts of Aravaipa Creek basin must have been greater than is shown by the lines of equal rainfall (fig. 14) in order to produce the peak discharge of 70,800 ft^3/s that was measured at site 41, 6 mi upstream from the mouth of Aravaipa Creek. The discharge began to increase sharply at 1400 hours on October 1, and from 1400 hours to about 1800 hours, the discharge increased from 9,040 ft^3/s to 70,800 ft^3/s. The time is not exact because the gage was damaged and did not record the peak. The peak discharge, which was computed from a slope-area measurement, is the largest known peak on Aravaipa Creek, is 3.5 times the previous maximum of August 1919, and is 1.9 times larger than the 100-year flood.

The flood peak from Aravaipa Creek joined the rising flow in the San Pedro River, and the combined flow reached a peak discharge of 135,000 ft^3/s at 2100 hours on October 1 at site 42 1 mi below the mouth of Aravaipa Creek. From 1600 hours to 2100 hours, the discharge at site 42 increased from 27,300 ft^3/s to 135,000 ft^3/s. Peak discharge is somewhat uncertain because of the large channel changes that took place during the flood (see Channel Changes). Peak discharge was computed on the basis of post-flood channel conditions; however, discharge is reasonable compared with peak discharges at downstream locations on the Gila River at Hayden (site 43) and at Kelvin (site 44). Peak discharge at site 42 was the largest since at least 1906 and exceeded the previous maximum of about 85,000 ft^3/s that occurred in September 1926.

Table 4.--Time and discharge of flood peaks on the San Pedro River, Palominas to Redington, Ariz., September 30 to October 3, 1983

Distance between sites, in miles											
		23			12			56			
San Pedro River at Palominas (site 36)			San Pedro River at Charleston (site 37)			San Pedro River near Tombstone (site 38)			San Pedro River near Redington (site 39)		
Date	Hour	Discharge, in cubic feet per . second	Date	Hour	Discharge, in cubic feet per second	Date	Hour	Discharge, in cubic per feet second	Date	Hour	Discharge, in cubic feet per second
09-30	2000	7,290	10-01	0230	6,630	10-01	0500	6,600	-----	----	-----
-----	----	-----	-----	----	-----	10-02	1515	13,600	10-02	2400	7,380
10-02	2130	8,180	10-03	0400	8,560	10-03	[1]0800	8,600	10-03	1600	5,930

[1] Estimated.

The peak discharge at site 43, which is 0.25 mi downstream from the mouth of the San Pedro River, was 125,000 ft^3/s, of which an estimated 15,000 ft^3/s was contributed by the Gila River. At Kelvin (site 44), 18 mi downstream from the mouth of the San Pedro River, the peak discharge was reduced to 100,000 ft^3/s. The gaging station at Kelvin (site 44) was inoperative during most of the flood, and the hydrograph was estimated on the basis of high-water marks and a discharge measurement made after the peak. The peak discharge is the largest since January 1916 when the peak discharge was 132,000 ft^3/s. Flow of the Gila River has been regulated by Coolidge Dam since 1928. If Coolidge Dam had not been in place in October 1983, the peak discharge at Kelvin would have been about 150,000 ft^3/s—an estimate based on routing flow of the Gila River from above Coolidge Dam to Kelvin and including inflow from the San Pedro River. The peak discharge from the upper Gila River would have arrived at Kelvin about 17 hours after the peak discharge from the San Pedro River.

Downstream from Kelvin, the peak discharge decreased to 61,000 ft^3/s at Florence (site 45), to 46,000 ft^3/s at Sacaton (site 46), and to 35,000 ft^3/s near Laveen (site 47), which is just upstream from the mouth of the Santa Cruz River. Peak discharge at site 47 occurred about 1400 hours on October 4. The peak discharge on the Santa Cruz River probably occurred a few hours earlier and was estimated to be 33,000 ft^3/s at the gaging station near the mouth (site 78). The combined peak discharge on the Gila River downstream from the confluence with the Santa Cruz River was estimated to be 65,000 ft^3/s. Flood hydrographs at sites 47 and 78 were not recorded; however, the times and magnitudes of peak discharges were estimated on the basis of flow routing from upstream stations on the Gila and Santa Cruz Rivers downstream to Gillespie Dam. The routing included inflow from the Salt River, and the routed hydrographs were adjusted to agree with discharge measurements made at Tuthill Bridge (table 5) 12.1 mi downstream from the confluence of the Salt and Gila Rivers and with the hydrograph at Gila River below Gillespie Dam (site 90).

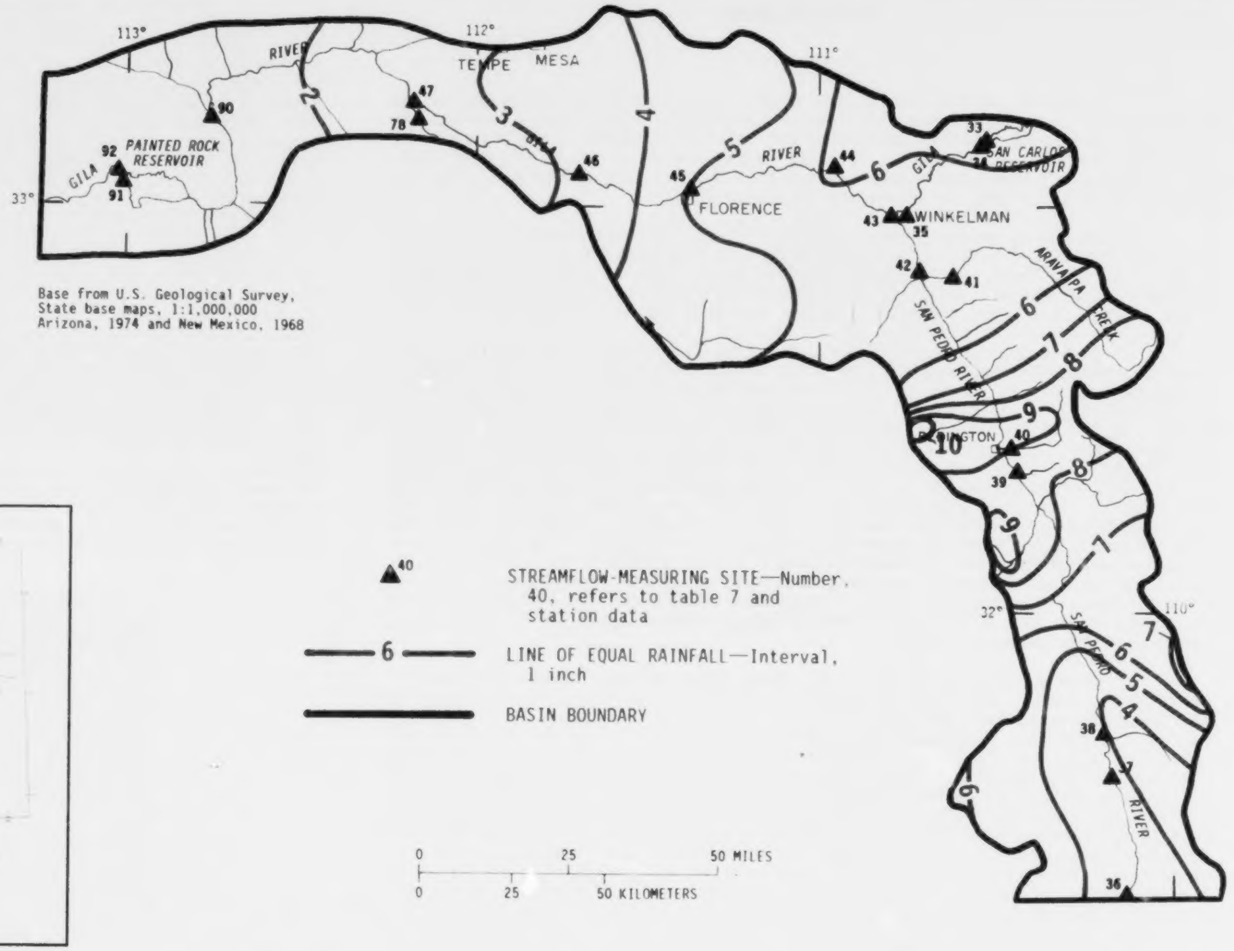
Flow over Gillespie Dam began about 0200 hours on October 3, and the peak discharge of 95,200 ft^3/s occurred at 1130 hours on October 5. Flow over the dam ceased on October 12; however, flow through the sluice gates continued into November.

At Painted Rock Reservoir (site 91), flood runoff from the Gila River basin downstream from Coolidge Dam was stored and gradually released. Release from the reservoir began on October 6, 1983, and continued into February 1984. Daily mean discharges below Painted Rock Dam (site 92) ranged from 105 ft^3/s to 4,000 ft^3/s. Maximum storage in Painted Rock Reservoir during this period was 528,600 acre-ft on October 24.

Table 5.--Discharge measurements, Gila River at Tuthill Bridge (Jackrabbit Road), 12.1 miles downstream from the confluence of the Salt and Gila Rivers, October 4-11, 1983

Date	Time	Discharge, in cubic feet per second	Date	Time	Discharge, in cubic feet per second
Oct. 4, 1983...	1520	49,400	Oct. 7, 1983...	1500	27,300
Oct. 5, 1983...	1220	76,800	Oct. 8, 1983...	1010	11,000
Oct. 6, 1983...	1215	38,400	Oct. 11, 1983...	1350	5,990

Station name	Site number
San Carlos Reservoir at Coolidge Dam, Ariz	33
Gila River below Coolidge Dam, Ariz	34
Gila River at Winkelman, Ariz	35
San Pedro River at Palominas, Ariz	36
San Pedro River at Charleston, Ariz	37
San Pedro River near Tombstone, Ariz	38
San Pedro River near Redington, Ariz	39
Redfield Canyon Wash at Redington, Ariz	40
Aravaipa Creek near Mammoth, Ariz	41
San Pedro River below Aravaipa Creek, near Mammoth, Ariz	42
Gila River at Hayden, Ariz	43
Gila River at Kelvin, Ariz	44
Gila River at U.S. Highway, 89, near Florence, Ariz	45
Gila River at State Highway 87, near Sacaton, Ariz	46
Gila River near Laveen, Ariz	47
Santa Cruz River near Laveen, Ariz	78
Gila River below Gillespie Dam, Ariz	90
Painted Rock Reservoir at Painted Rock Dam, Ariz	91
Gila River below Painted Rock Dam, Ariz	92


113°
112°
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110°
33°
32°
RIVER
TEMPE
MESA
GILA
PAINTED ROCK RESERVOIR
FLORENCE
WINKELMAN
SAN CARLOS RESERVOIR
ARAVAIPA CREEK
SAN PEDRO RIVER
REDINGTON
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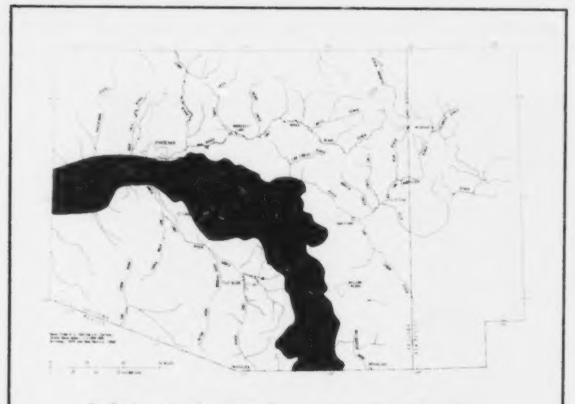
9
10
STREAMFLOW-MEASURING SITE—Number, 40, refers to table 7 and station data
LINE OF EQUAL RAINFALL—Interval, 1 inch
BASIN BOUNDARY
0 25 50 MILES
0 25 50 KILOMETERS

Base from U.S. Geological Survey, State base maps, 1:1,000,000 Arizona, 1974 and New Mexico, 1968



Index map showing location of subbasin.

Figure 14.--Total storm rainfall, September 27 to October 3, 1983, and streamflow-measuring sites in San Pedro River and Gila River basins from Coolidge Dam to Painted Rock Dam.

Santa Cruz River

Flooding on the Santa Cruz River from Continental (site 55) to the mouth (site 78) was the largest on record (fig. 15). The flood exceeded the 100-year recurrence interval at Continental (site 55), Tucson (site 58), Cortaro (site 74), and at the mouth (site 78). At Tucson where the record began in 1915, the flood was 2.2 times the previous maximum of October 1977 and probably was the largest flood since 1892 (Aldridge and Eychaner, 1984).

Rainfall in the upper Santa Cruz River basin was as much as 9.72 in. north of Nogales and 9.90 in. at Mount Lemmon in the Santa Catalina Mountains north of Tucson. Most of the rainfall in the basin occurred from September 29 to October 2, and rainfall intensity was the greatest during the mornings of October 1 and 2 (fig. 16). Downstream from Tucson, rainfall amounts decreased steadily.

In the upper reaches of the Santa Cruz River, the flood peak was less than the peak of October 1977, which was the previous maximum flood on much of the Santa Cruz River. At Santa Cruz River near Nogales (site 50), peak discharge was 16,000 ft^3/s, just slightly more than half the magnitude of the peak of October 1977. At Continental (site 55), 48 mi downstream, however, the peak discharge had increased to 45,000 ft^3/s, which was 1.7 times greater than the peak of 1977. Significant inflow between sites 50 and 55 came from Sonoita Creek (site 52), Peck Canyon (site 54), and Demetrie Wash, 4.5 mi upstream from Continental. The peak discharge of 16,000 ft^3/s on Sonoita Creek (site 52) upstream from Patagonia Lake was the largest in 54 years of record. Downstream from Patagonia Lake, peak discharge was estimated to be 9,000 ft^3/s at a site 3.5 mi upstream from the mouth of Sonoita Creek. A peak discharge of 12,100 ft^3/s on Peck Canyon has an estimated recurrence interval of greater than 100 years. The peak discharge on Demetrie Wash at Interstate 19 was estimated at 10,500 ft^3/s from a drainage area of 33.1 mi^2 (James Blodgett, hydrologist, U.S. Geological Survey, written commun., 1986).

Peak discharge on the Santa Cruz River at Continental (site 55) occurred at about 1445 hours on October 2, but 28 mi downstream at Tucson (site 58), peak discharge occurred nearly 11 hours earlier at 0400 hours on October 2. The peak discharge at Tucson (site 58) was 52,700 ft^3/s; 40,000 ft^3/s of this total probably originated in the 540-square-mile drainage area between Continental and Tucson. In this area, Lee Moore Wash, which has a drainage area of 142 mi^2, reached an estimated peak discharge of 10,000 ft^3/s at the Southern Pacific Railroad crossing. Lee Moore Wash joins the Santa Cruz River from the east 12 mi upstream from site 58. A hydrograph was estimated at site 58 from frequent measurements of stage, a current-meter measurement, float-area measurement, slope-area measurement, and by flow routing from site 55. The float-area measurement of 20,700 ft^3/s was made at 1100 hours on October 2 (fig. 17), and maximum measured surface velocity was 18.8 ft/s.

Rillito Creek joins the Santa Cruz River 8.6 mi downstream from site 58. A hydrograph for Rillito Creek at site 71, 5 mi above the mouth, was estimated from current-meter measurements made on October 1, 2, and 3, a slope-area measurement of the peak discharge, field observations, and by flow routing from upstream gaging stations. The peak discharge of 29,700 ft^3/s, which occurred about 1200 hours on October 2, was the largest since at least 1915, and the recurrence interval exceeded 100 years.

Streams in Rillito Creek basin generally had small to moderate peaks on October 1 or 2 (sites 61-70). An exception was Tanque Verde Creek (site 61) where a peak discharge of 8,600 ft^3/s was recorded from a drainage area of 43 mi^2. After several days of rain, however, the entire basin was contributing runoff, and accumulated runoff capped by the intense rainfall on the morning of October 2 resulted in the record peak discharge on Rillito Creek.

Flow in the Santa Cruz River plus flow in Rillito Creek plus a small contribution from Canada del Oro (site 73) resulted in a peak at Cortaro (site 74) of 65,000 ft^3/s at about 0600 hours on October 2. Magnitude and time of the peak discharge are based on routing of estimated hydrographs for Santa Cruz River at Tucson and Rillito Creek near Tucson (H.W. Hjalmarson, written commun., 1986). The gaging station at site 74 stopped operating at about 0800 hours on October 2 when the bridge to which it was attached washed out. Large channel changes already had occurred, and beginning about 1500 hours on October 1, the stage-discharge relation was no longer effective. The peak discharge was 2.8 times the previous maximum of 23,000 ft^3/s, which occurred in October 1977, and the estimated recurrence interval of the peak discharge is greater than 100 years.

Flooding in Avra Valley was measured on Brawley Wash near Three Points (site 75) where the peak discharge was 19,100 ft^3/s and on Los Robles Wash, a continuation of Brawley Wash, near Marana (site 76) where the peak discharge was 12,500 ft^3/s. Peak discharge near Three Points was the largest since at least 1955, and the recurrence interval was estimated to be about 100 years. At site 76, the peak discharge was less than half of the September 1962 flood, which probably was the largest flood at this site since at least 1885. About 3.5 mi downstream from site 76, the flow from Brawley-Los Robles Wash joined the Santa Cruz River. Downstream from this junction, inflow to the Santa Cruz River was minor, and the peak discharge decreased as the flow spread over broad areas of desert and farmland. At the junction with the Gila River (site 78), peak discharge was reduced to 33,000 ft^3/s, which is the largest discharge to reach the mouth of the Santa Cruz River since records began in 1940. The previous maximum was 9,200 ft^3/s in September 1962. Arrival time of the peak at the mouth of the Santa Cruz River, which was estimated by flood routing, was 1100 hours on October 4, a few hours before the arrival of the peak on the Gila River.

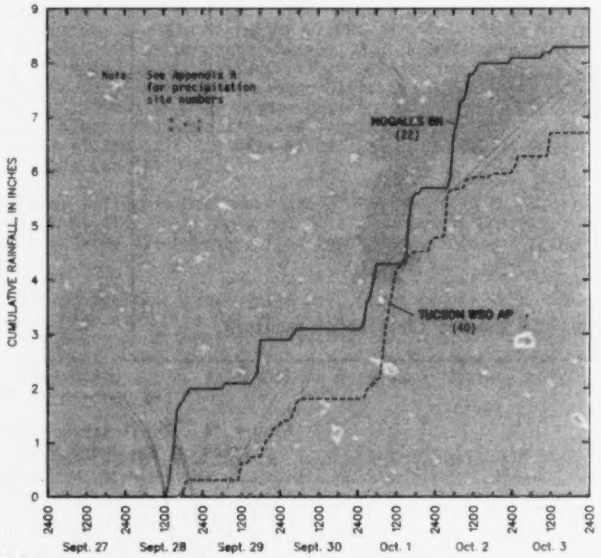


Figure 16.--Cumulative rainfall at two precipitation stations in the Santa Cruz River basin, September 27 to October 3, 1983.

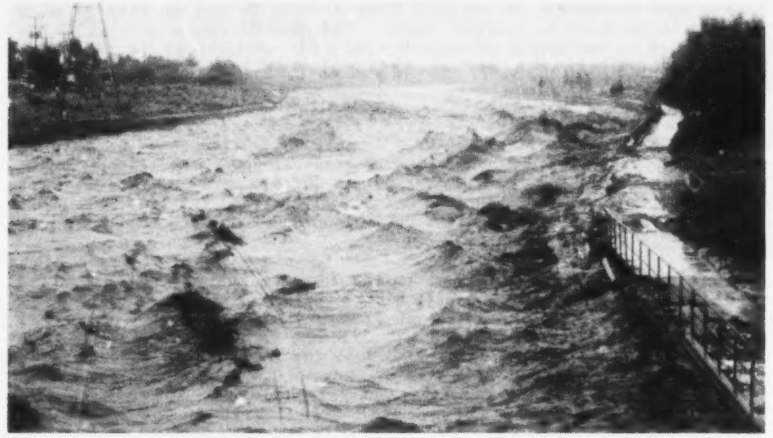
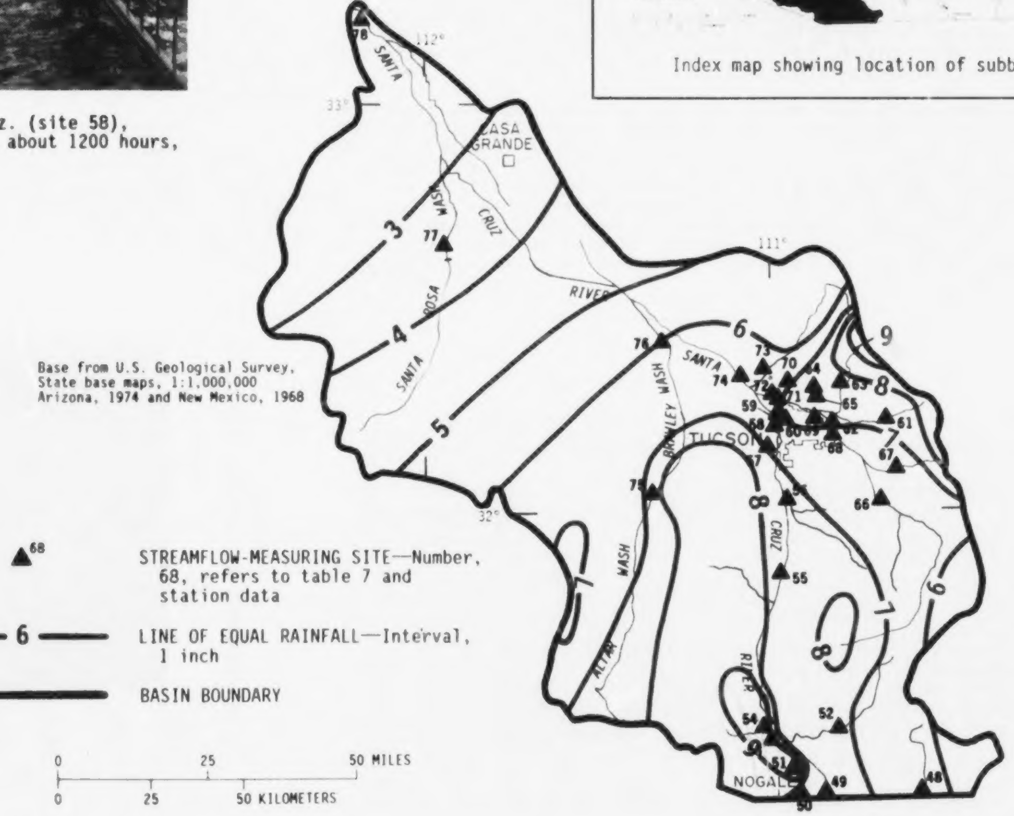


Figure 17.--View of the Santa Cruz River at Tucson, Ariz. (site 58), looking upstream from the Congress Street bridge at about 1200 hours, October 2, 1983. (Photograph by J.K. Boling.)

Station name	Site number
Santa Cruz River near Lochiel, Ariz......	48
Santa Cruz River near Nogales, Ariz......	49
Ephraim Canyon Wash near Nogales, Ariz...	50
Potrero Creek at mouth, near Nogales, Ariz..........................	51
Sonoita Creek near Patagonia, Ariz.......	52
Agua Fria Canyon near Rio Rico, Ariz.....	53
Peck Canyon near Rio Rico, Ariz..........	54
Santa Cruz River at Continental, Ariz....	55
Flato Wash near Sahuarita, Ariz..........	56
Cholla Wash at Tucson, Ariz..............	57
Santa Cruz River at Tucson, Ariz.........	58
Cemetery Wash at Tucson, Ariz............	60
Flowing Wells Wash at Tucson, Ariz.......	61
Tanque Verde Creek near Tucson, Ariz.....	62
Rob Wash at Tucson, Ariz.................	63
Sabino Creek near Tucson, Ariz...........	64
Craycroft Wash Tributary near Tucson, Ariz..........................	65
Pantano Wash near Vail, Ariz.............	66
Rincon Creek near Tucson, Ariz...........	67
Pantano Wash at Broadway Blvd., at Tucson, Ariz.......................	68
Alamo Wash at Tucson, Ariz.......	69
Pima Wash near Tucson, Ariz..............	70
Rillito Creek near Tucson, Ariz..........	71
Roller Coaster Wash near Tucson, Ariz....	72
Canada del Oro near Tucson, Ariz.........	73
Santa Cruz River at Cortaro, Ariz........	74
Brawley Wash near Three Points, Ariz.....	75
Los Robles Wash near Marana, Ariz........	76
Santa Rosa Wash near Vaiva Vo, Ariz......	77
Santa Cruz River near Laveen, Ariz.......	78

Index map showing location of subbasin.



112°
111°
33°
32°
78
SANTA
CASA GRANDE
WASH
CRUZ
77
3
4
5
RIVER
ROSA
SANTA
6
76
SANTA
73
70
64
63
9
8
74
72
71
65
59
58
60
69
62
61
TUCSON
68
7
67
57
75
56
66
BRAWLEY WASH
8
CRUZ
55
WASH
7
ALTAR
RIVER
8
7
6
54
52
9
51
NOGALES
49
48
50
▲68 STREAMFLOW-MEASURING SITE—Number, 68, refers to table 7 and station data
—6— LINE OF EQUAL RAINFALL—Interval, 1 inch
BASIN BOUNDARY
0
25
50 MILES
0
25
50 KILOMETERS

Base from U.S. Geological Survey, State base maps, 1:1,000,000 Arizona, 1974 and New Mexico, 1968

Figure 15.--Total storm rainfall, September 27 to October 3, 1983, and streamflow-measuring sites in Santa Cruz River basin.

Salt River

The main area of flood runoff in the Salt River basin was in the high country drained by the Black and White Rivers (fig. 18). The greatest measured rainfall in the basin was at Hawley Lake at an elevation of 8,180 ft where 8.49 in. of rain was measured for the storm period, September 27 to October 3, and 7.68 in. of that total fell between 0800 hours on September 28 and 0800 hours on October 2. The rain produced runoff peaks on September 30, October 1, and October 2 in the White River watershed. At East Fork White River near Fort Apache (site 83), all three peaks exceeded the previous maximum, and at North Fork White River near McNary (site 82), the peaks on October 1 and 2 exceeded the previous maximum. At White River near Fort Apache (site 84) near the confluence with the Black River, the peak discharge was exceeded by the peak of December 1978 (table 6).

At the uppermost gaging station in the Black River watershed, Black River near Maverick (site 79), the peak discharge exceeded the previous maximum which occurred in October 1972. At Black River near Point of Pines (site 80), the peak discharge was slightly less than the peak of October 1972. Near the confluence with the White River, the peak discharge at Black River near Fort Apache (site 81) was the largest since 1916.

Peak flows on the Black and White Rivers arrived at the confluence of the two rivers almost simultaneously on both October 1 and October 2 (fig. 19). Peaks on the Black River, reinforced by smaller peaks on the White River, can be tracked downstream on the Salt River to the gaging station, Salt River near Chrysotile (site 85). The peak on October 1 traveled 38 mi from site 81 to site 85 in 5.5 hours, and the larger peak on October 2 traveled the same distance in 4.5 hours. As the flood peaks moved downstream from site 85, the volume of flow increased and the peaks became more rounded. Traveltime from site 85 to site 86—a distance of 42 mi—was 8 hours for the first peak and about 5 hours for the second peak.

Table 6.--Comparison of peak discharges of October 1983 with peak discharges of previous floods on the Black and White Rivers

Location number[1]	Station name	Discharge, in cubic feet per second		
		October 1972	December 1978	October 1983
79	Black River near Maverick........	11,100	10,300	14,100
80	Black River below pumping plant, near Point of Pines.............	17,900	12,400	17,300
81	Black River near Fort Apache.....	28,400	40,200	44,200
82	North Fork White River near McNary..........................	893	1,060	2,310
83	East Fork White River near Fort Apache.....................	732	751	1,700
84	White River near Fort Apache.....	4,270	14,600	9,410

[1] See figure 1 and table 7.

The peak discharges on the Salt River at site 85 and at site 86 were not outstanding in relation to previous peaks. The peak discharge at site 85 has been exceeded twice in the period of record—1925-83—as well as in 1916. At site 86, the peak discharge was exceeded eleven times in the period of record—1924-83—as well as 1916.

Inflow to the Salt River reservoir system for the period September 30 to October 6 was 253,900 acre-ft as measured at site 86. Net change in contents of the reservoir system (site 87) was -12,000 acre-ft, and the release from the reservoir system (site 88) for the same period was 262,600 acre-ft. Release was increased from 587 ft^3/s at 1500 hours on October 1 to 31,600 ft^3/s at 1400 hours on October 2 and remained nearly constant until 1400 hours on October 4 at which time the release was stepped down (fig. 20).

Little attenuation occurred as the flow in the Salt River moved downstream to the confluence with the Gila River. Between site 88 and site 89—a distance of 32 mi—the loss in volume of flow over a period of 6 days was 5 percent. Volume of flow at site 88 was 272,000 acre-ft from 1530 hours on October 1 to 1530 hours on October 7. Inflow from the Verde River, which joins the Salt River 6 mi downstream from site 88, was 43,000 acre-ft for the period October 1-6. Combined flow in the Salt and Verde Rivers, therefore, was 315,000 acre-ft. At site 89 at the 24th Street bridge, the volume was 299,000 acre-ft from 0430 hours on October 2 to 0430 hours on October 8.

Traveltime between sites 88 and 89 was 8 hours. At this rate, or perhaps slightly slower, flow of about 30,000 ft^3/s should have reached the confluence with the Gila River at about 1000 to 1100 hours on October 2. Arrival time of the peak was about 52 hours before the peak discharge on the Gila River. Flow from the Salt River began to reach Gillespie Dam (site 90) at 0200 hours on October 3; by 1000 hours, the flow had increased to 32,000 ft^3/s. Traveltime for 32,000 ft^3/s of water to flow 48 mi downstream from site 89 to site 90 was 28 hours.

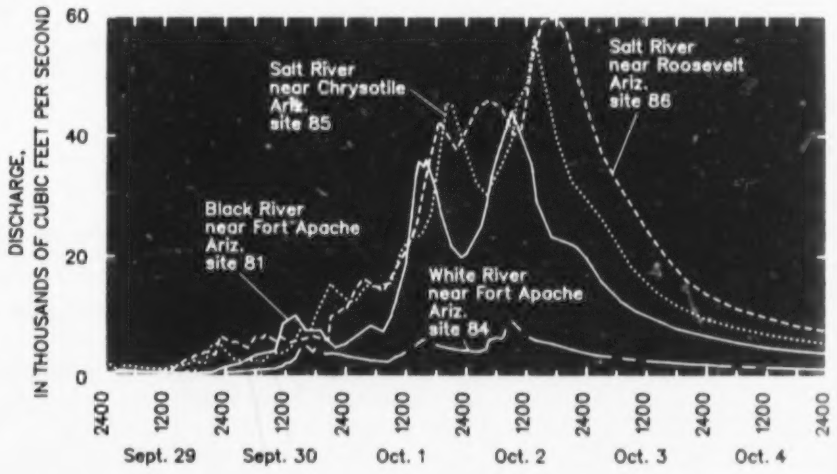
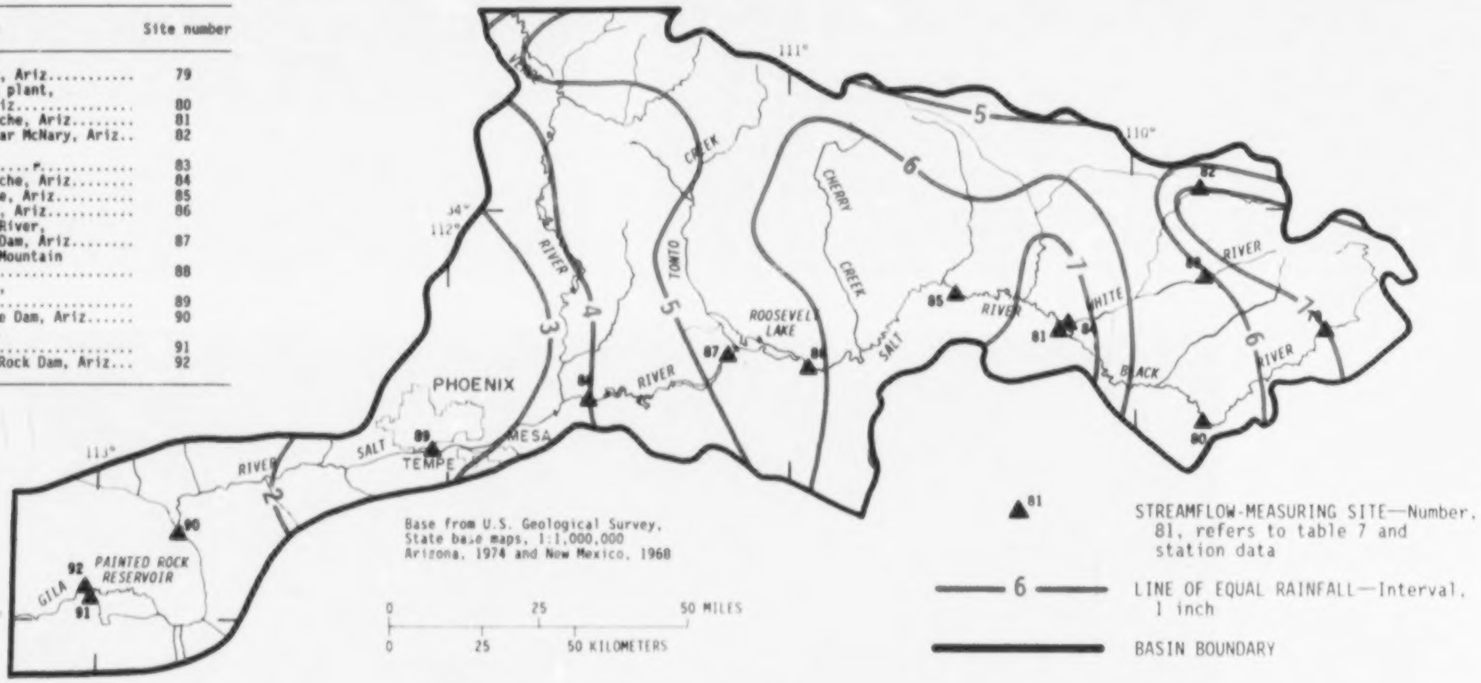


Figure 19.--Discharge at gaging stations on White, Black, and Salt Rivers upstream from Roosevelt Lake, Ariz., September 29 to October 4, 1983.

Station name	Site number
Black River near Maverick, Ariz	79
Black River below pumping plant, near Point of Pines, Ariz	80
Black River near Fort Apache, Ariz	81
North Fork White River near McNary, Ariz	82
East Fork White River near Fort Apache, Ariz	83
White River near Fort Apache, Ariz	84
Salt River near Chrysotile, Ariz	85
Salt River near Roosevelt, Ariz	86
Reservoir system on Salt River, at and below Roosevelt Dam, Ariz	87
Salt River below Stewart Mountain Dam, Ariz	88
Salt River at 24th Street, at Phoenix, Ariz	89
Gila River below Gillespie Dam, Ariz	90
Painted Rock Reservoir at Painted Rock Dam, Ariz	91
Gila River below Painted Rock Dam, Ariz	92



111°
110°
34°
112°
113°
33°
5
6
7
4
3
2
PHOENIX
TEMPE
MESA
SALT
RIVER
TONTO
CREEK
CHERRY
CREEK
ROOSEVELT LAKE
WHITE
BLACK
PAINTED ROCK RESERVOIR
GILA
79
80
81
82
83
84
85
86
87
88
89
90
91
92
0 25 50 MILES
0 25 50 KILOMETERS
81
STREAMFLOW-MEASURING SITE—Number, 81, refers to table 7 and station data
6
LINE OF EQUAL RAINFALL—Interval, 1 inch
BASIN BOUNDARY

Base from U.S. Geological Survey, State base maps, 1:1,000,000 Arizona, 1974 and New Mexico, 1968

Figure 18.--Total storm rainfall, September 27 to October 3, 1983, and streamflow-measuring sites in the Salt River basin.

Index map showing location of subbasin.

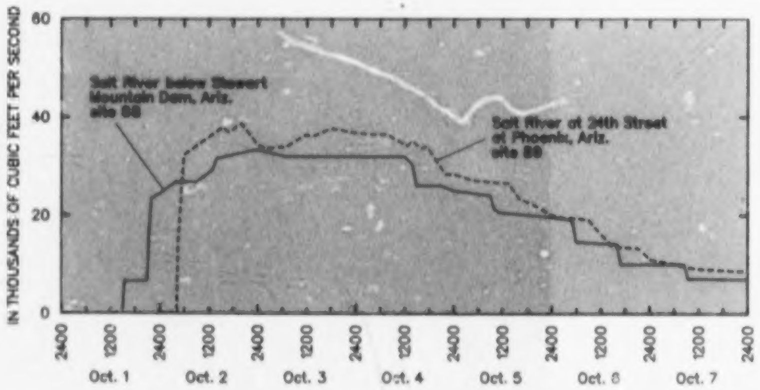


Figure 20.--Discharge at gaging stations downstream from the reservoir system on the Salt River, October 1-7, 1983.

Boundaries of flood inundation were delineated along the Santa Cruz River from the community of Rillito, 17 mi downstream from Tucson, to the junction with the Gila River (fig. 21) on the basis of satellite photography, high- and low-altitude vertical aerial photography, hand-held oblique aerial photography, field inspection of selected areas, and interviews with local residents and other investigators. The satellite photography consists of three color-composite frames from National Oceanic and Atmospheric Administration Landsat 4 at a scale of 1:250,000. Two of the frames were taken on October 7 and one on October 14. The high-altitude aerial photography is false-color infrared at a scale of 1:30,000 and was taken on October 14 by the National Aeronautics and Space Administration. The low-altitude vertical photography is black and white and was taken on October 3. Some photography is at a scale of 1:15,000, and the remainder is at 1:20,000. Throughout much of the reach, the low-altitude vertical photography did not cover the full width of inundation, and the northern limit of the coverage was about midway between Stanfield and Maricopa. The Landsat-4 and hand-held oblique aerial photography were especially useful in defining boundaries of inundated areas beyond the limits of coverage provided by the low-altitude vertical photography. The inundation boundaries from all sources were transferred to the color composite Landsat-4 photographs at a scale of 1:250,000.

The inundated area in the reach shown in figure 21 was about 268 mi². Communities that were inundated by the Santa Cruz River were Rillito, Marana, Eloy, Chuichu, Maricopa, and Santa Cruz. Near Rillito, some floodwater flowed across Interstate Highway 10 through the Avra Valley Road underpass and along the northeast side of the highway for about 8 mi before returning to the main flow. Just north of Rillito, floodwater topped the northbound lane of Interstate 10;

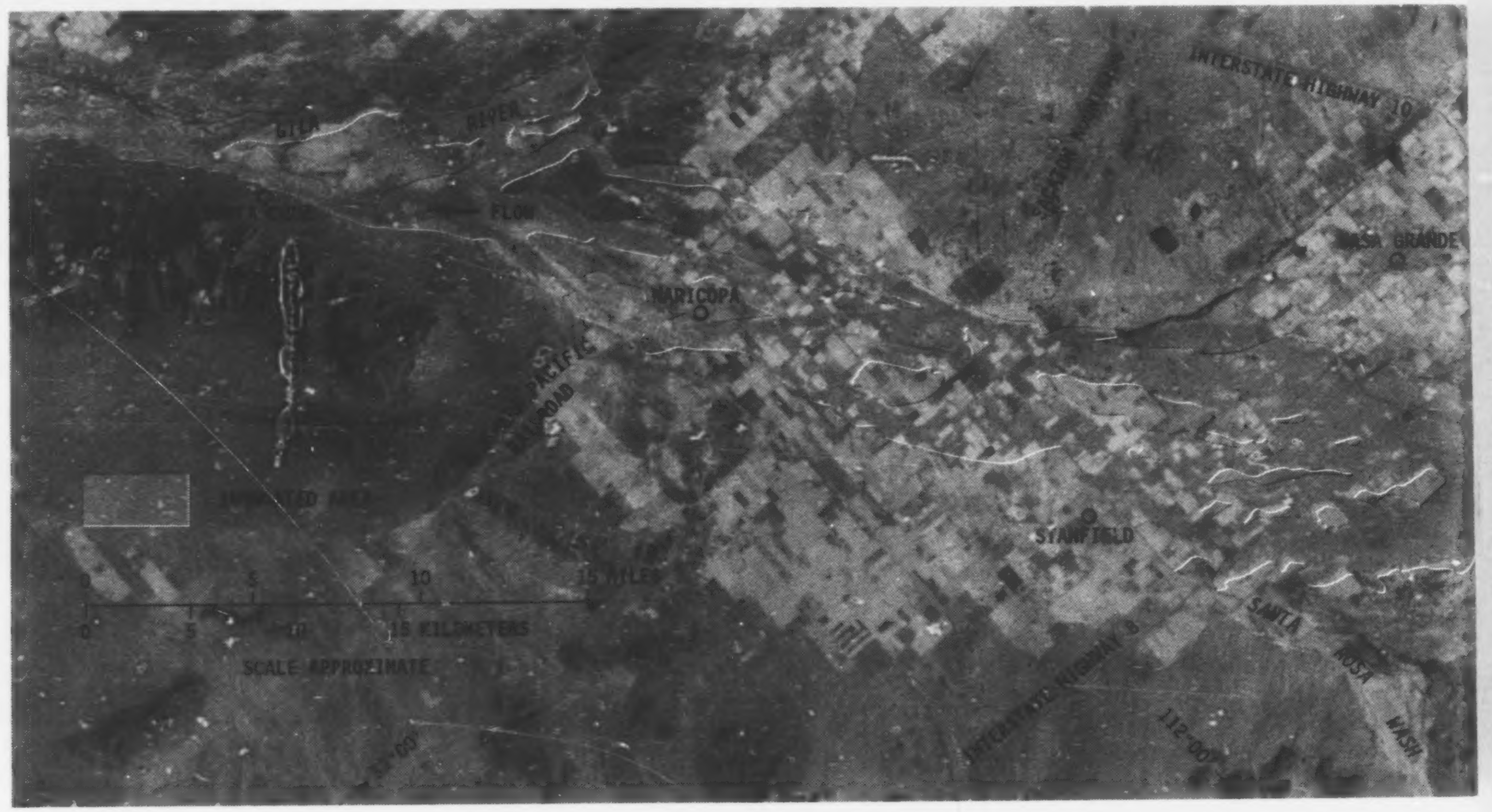


Figure 21.--Approximate area inundated by the Santa Cruz River from Rillito, Ariz., to the Gila River, October 2-4, 1983. Original Landsat photographs courtesy

however, the depth was not sufficient to halt traffic. Downstream from the community of Rillito, floodwater began to spread over a 2- to 3-mile-wide area. South of Picacho Peak, an area of flooding that could not be defined by aerial coverage is indicated on figure 21 by arrows showing the direction of flow. Where the Santa Cruz River begins to follow the Greene Canal alinement south of Picacho Peak, a part of the flow followed ditches, roads, and a remnant of the old Santa Cruz River channel northward toward Eloy. In the area between Greene Canal and Eloy, the inundated area could not be precisely defined; however, within the boundaries shown many of the fields were inundated. Most of the floodwater flowed west toward the former Greene Reservoir area and then northward along Greene Wash. Near Chuichu, the area of flooding increased to nearly 4 mi wide, and at Interstate Highway 8, the area of flooding was more than 8 mi wide. Between Maricopa and the junction with the Gila River, a connection between the Santa Cruz and Gila Rivers occurred in which water from the Gila River probably flowed into the Santa Cruz River. Areas of inundation in selected reaches along the Gila River are shown in a report by Garrett, Roeske, and Bryce (1986).

Previous floods for which inundated areas were mapped in this reach occurred in September 1962 and October 1977. In September 1962, most of the floodwater originated in the Brawley-Los Robles Wash drainage and the Santa Rosa Wash drainage. In the Greene Reservoir area and downstream in the Chuichu area, the extent of flooding in 1983 was similar to flooding in 1962 (U.S. Army Corps of Engineers, 1963). In October 1977, the flood on the Santa Cruz River originated mainly upstream from Tucson and by the time the flood peak reached Greene Canal, the peak discharge was reduced to 5,200 ft^3/s (Aldridge and Eychaner, 1984). Throughout the reach, inundation in 1977 was less extensive than in 1983 (fig. 21).

SOUTHERN PACIFIC RAILROAD
CASA GRANDE MOUNTAINS
GREENE RESERVOIR
AVRA VALLEY

ational Oceanic and Atmospheric Administration. Photograph reproduction by EROS Data Center. Image identification, 84044817272x0, 84044817274x0, 84045517333x0.

Large rates and volumes of flow during the flood caused large changes in the channels of many streams in southeastern Arizona. In the Tucson area, Saarinen and others (1984) mapped bank erosion along 25 mi of the Santa Cruz River and along 21 mi of the Rillito Creek-Tanque Verde Creek-Pantano Wash system. In the Marana area, Hays (1984) detailed the channel changes in a 9.5-mile reach of the Santa Cruz River. Channel widening in the Marana area was the largest since the winter floods of 1914-15 (Hays, 1984). Channel changes at five sites on several major streams are shown by comparison of cross-sectional surveys made before and after the flood.

Gila River, 2.8 Miles Upstream from Gila River at Head of Safford Valley, near Solomon, Ariz. (Site 27)

Slope-area measurement surveys were made 2.8 mi upstream from site 27 in 1972, 1978, and 1983 following large floods. Cross sections (fig. 22) show that erosion removed as much as 170 ft of the left-bank terrace since 1972 and that about half of the erosion occurred during the flood of December 1978 when peak discharge was 100,000 ft^3/s. The terrace, which is located on the outside of a gradual bend in the Gila River, is composed of silt and sand and has a cover of mesquite trees. Minckley and Clark (1984) documented similar erosion of a mesquite-covered terrace from 1970 to March 1983 at a site 1.5 mi downstream.

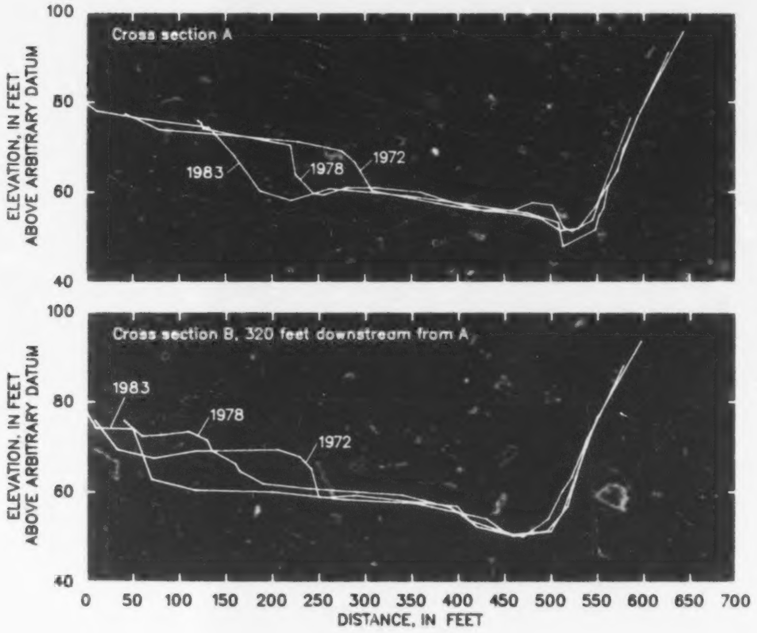


Figure 22.--Changes in channel geometry of Gila River 2.8 miles upstream from site 27, October 1972, December 1978, and October 1983.

Aravaipa Creek near Mammoth, Ariz. (Site 41)

The main channel at the gaging station was enlarged by the flood to about twice the width of March 1980 (fig. 23). The right bank is stable conglomerate rock that slopes about 45°. The left bank is a terrace composed mostly of silt and sand with a cover of trees and brush.

San Pedro River below Aravaipa Creek, near Mammoth, Ariz. (Site 42)

After the flood, the channel near site 42 was 700 to 1,000 ft wide (fig. 24). Before the flood, the channel was about 200 ft wide, and the remainder of the flood plain was covered with brush and trees. A small cross section surveyed at site 42 in March 1983 is compared with a post-flood cross section (fig. 25) 150 ft downstream from site 42. The left bank at the cross section is fairly stable. The right bank is a flat overflow plain of irrigated fields separated from the main channel by a strip of trees.

Santa Cruz River at Cortaro, Ariz. (Site 74)

The channel of the Santa Cruz River in the vicinity of Cortaro Road was greatly enlarged, and, in places, an entirely new channel was cut. Channel conditions after the flood were compared with channel conditions during the flood of October 1977 when the peak discharge was 23,000 ft^3/s (fig. 26). At a cross section 600 ft downstream from Cortaro Road, the channel was about 3 times larger after the flood than it was in May 1981 (fig. 27). The flood plain on both banks is quite flat and is composed of silt and sand and has an uneven cover of tumbleweeds and other low vegetation.

Brawley Wash near Three Points, Ariz. (Site 75)

The channel at the former crest-stage station, which is 0.25 mi downstream from State Highway 86, was widened and deepened by the flood (fig. 28). The channel bed at site 75 is mostly sand and gravel, and the banks are composed of silt and sand. Mesquite trees along the right bank apparently helped to prevent serious erosion of the bank. Low vegetation covers the left bank.

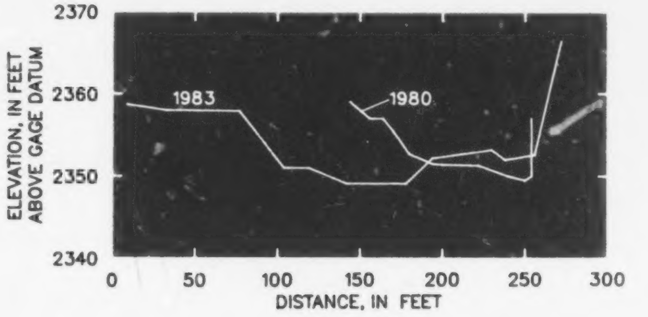


Figure 23.--Changes in channel geometry of Aravaipa Creek near Mammoth, Ariz. (site 41), March 1980 and October 1983.

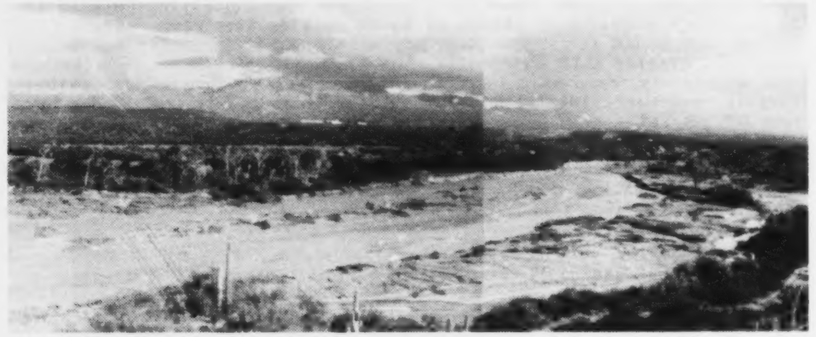


Figure 24.--View of the San Pedro River below Aravaipa Creek, near Mammoth, Ariz. (site 42), looking upstream, November 4, 1983. Gaging station is near the right edge of the photograph but is not visible.

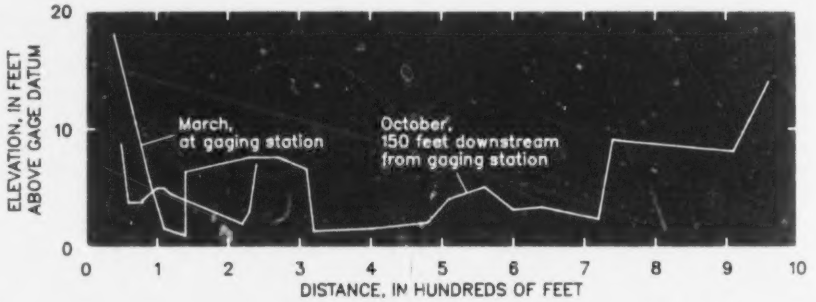


Figure 25.--Changes in channel geometry of San Pedro River below Aravaipa Creek, near Mammoth, Ariz. (site 42), March 1983 and October 1983.

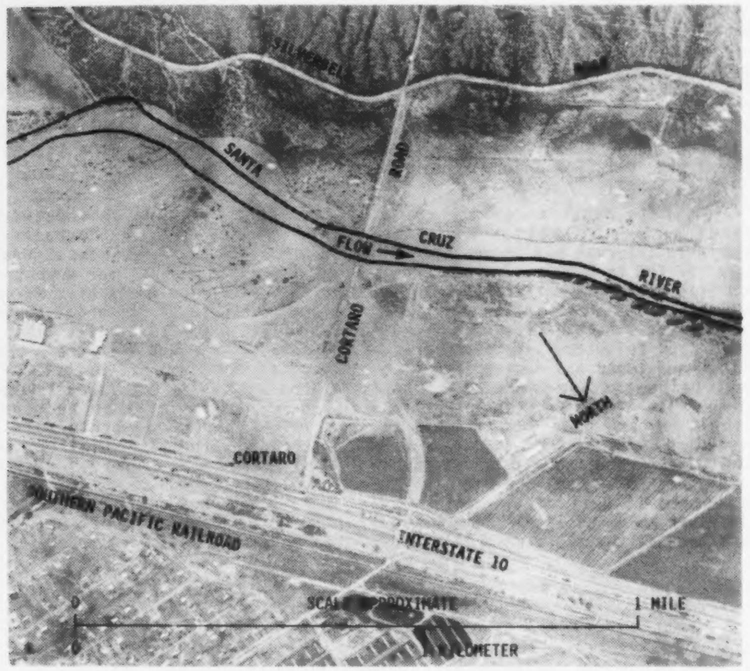

SANTA
FLOW
CRUZ
RIVER
ROAD
CORTARO
NORTH
CORTARO
SOUTHERN PACIFIC RAILROAD
INTERSTATE 10
0
SCALE APPROXIMATE
1 MILE
0
KILOMETER

Figure 26.--Santa Cruz River at Cortaro, Ariz. (site 74), October 3, 1983. The October 1977 main channel is outlined for comparison of channel width in the vicinity of Cortaro Road. Photograph courtesy of Cooper Aerial Photo.

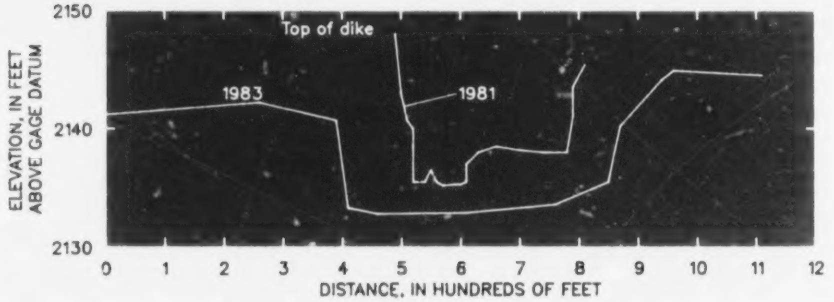


Figure 27.--Changes in channel geometry of Santa Cruz River 600 feet downstream from site 74, May 1981 and October 1983.

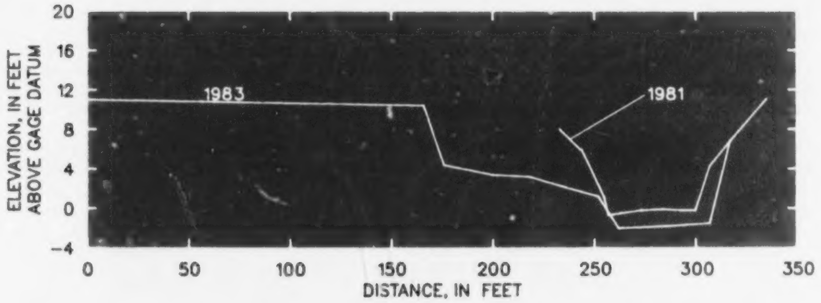


Figure 28.--Changes in channel geometry of Brawley Wash near Three Points, Ariz. (site 75), July 1981 and October 1983.

Flood frequency was analyzed for 93 streamflow sites to estimate the probability that other floods larger than those of October 1983 might occur in the future. Flood frequency for a site is described by a relation between peak discharges and the probability that each discharge will be exceeded during a single year (fig. 29). The probability is usually expressed by its reciprocal, the recurrence interval. For example, to state that a certain discharge has a 100-year recurrence interval means that the risk of having a larger discharge during the next year is 1/100, or 1 percent. Floods in separate years generally are assumed to be independent, which means that the risk of having a large flood next year is not affected by the size of this year's flood.

The flood history of gaged sites can be analyzed statistically to estimate the peak discharges for various probabilities. The largest peak discharge during each year of record is taken as a random sample from the flood distribution. In approximate terms, if half the floods in past years were greater than discharge A and 10 percent were larger than discharge B, then the 2-year (50-percent) flood would be A and the 10-year (10 percent) flood would be B (fig. 29). The statistical method is described by Hydrology Subcommittee (1982).

The statistical analysis results in a mathematical relation that can be plotted on a graph. Observed floods can be assigned empirical probabilities and plotted on the same graph. The frequency relation is not, however, a "best-fit" line through the plotted positions of the observed floods. Frequency relations and observed flood data for two sites are shown in figure 30.

Frequency analysis does not give a single right answer for the discharge associated with a given recurrence interval. Uncertainty is always present, especially for large recurrence intervals (rare floods). In the hypothetical 30-year record (fig. 29), the 2-year flood is well known, because 15 larger floods have occurred. The 10-year flood is fairly well known because three larger floods have occurred. For many purposes, however, a 100-year (1 percent) flood estimate is needed. A 1-percent discharge probably would be exceeded by 0.3 floods in a 30-year record, but such a value cannot be selected from the data. Until about 200 years of data has been recorded including two 100-year floods, a 100-year flood estimate would be uncertain. Estimation of recurrence intervals for observed floods is described by Hirsch and Stedinger (1987).

The amount of uncertainty can be estimated using the methods in Hydrology Subcommittee (1982). Dashed lines in figure 30 show the range within which the frequency relations would fall for two-thirds of successive equal-length flood histories at each site. For Aravaipa Creek (site 41), the 100-year flood estimate is 37,800 ft^3/s, but there is one chance in three that the true 100-year flood is outside the range of 29,000 to 52,000 ft^3/s. At Sabino Creek (site 63), there are two chances in three that the true 100-year flood discharge is between 8,400 and 14,000 ft^3/s. In Arizona the limits of this range of uncertainty commonly differ by more than 50 percent for 100-year flood estimates, and the range exceeds 25 percent even for 2-year flood estimates.

In evaluating the recurrence interval of an observed flood, consider the graphs from the discharge axis. For Aravaipa Creek, the recurrence interval for a discharge of 20,000 ft^3/s has a two-thirds chance of lying between 13 and 35 years and a one-third chance of being outside that range. For discharges greater than 37,000 ft^3/s, the right-hand confidence limit indicates recurrence intervals greater than 200 years, which are impossible to measure. Because of this uncertainty, recurrence intervals are reported with limited precision; the largest recurrence intervals are identified in this report as simply "greater than 100 years."

Flood frequency at sites with limited or no gage data can be estimated from regional equations developed by comparing characteristics of gaged basins to flood frequencies (Roeske, 1978; Eychaner, 1984). For some sites, a weighted average of frequencies estimated from gage data and regional equations was used.

Among the gaged sites, 23 had small floods or recurrence intervals of less than 10 years, 40 had large floods—10-70 years—and 19 had outstanding floods—greater than 70 years (fig. 31). The median recurrence interval was 20 years for gaged sites and 70 years for ungaged sites. Recurrence intervals at ungaged sites were larger because data-collection efforts were concentrated on sites with large peaks. Recurrence intervals and peak discharges for the flood period at the 93 streamflow sites are listed in table 7 in the section entitled "Streamflow Data at Gaging Stations and Miscellaneous Measuring Sites."

Outstanding floods occurred in basins with 500 to 20,000 mi^2 of contributing area and in smaller basins along the axis of most intense precipitation. The smallest discharges in the outstanding class were on the North and East Forks of the White River (sites 82 and 83), which are in a high-elevation region where snowmelt floods predominate. No outstanding floods were recorded in basins smaller than 35 mi^2 because even the highest rainfall intensities from this storm were less than those possible in summer thunderstorms. Small floods were recorded in small basins away from the axis of intense precipitation and in large basins on the periphery of the storm.

The recurrence interval at a site reflects a balance between the amount of precipitation and its timing in each part of the basin. The recurrence interval may increase or decrease as the flood moves downstream. In basins of 100 to 5,000 mi^2, recurrence intervals tended to increase downstream as each tributary peak entered near the main crest. Along the Santa Cruz River, the recurrence interval increased from 10 years near Lochiel (site 48) to greater than 100 years at and below Continental (site 55). In contrast, if little water enters from tributaries, a flood crest attenuates as it moves downstream becoming broader and lower and decreasing its recurrence interval. The crest on the Gila River below the San Pedro River decreased from a 90-year recurrence interval at Hayden (site 43) to 60 years at Laveen (site 47). Reservoirs also reduced peak discharges and affected recurrence intervals. Recurrence intervals below reservoirs were based on annual peaks that represent reservoir operating policy. The 100-year recurrence interval of the Gila River at Calva (site 31) was reduced to 10 years below Coolidge Dam (site 34). Finally, the recurrence interval will be reduced if part of the watershed does not contribute to the flood. On the Gila River below Gillespie Dam (site 90), the recurrence interval was only 15 years because the storm covered only about 60 percent of the watershed.

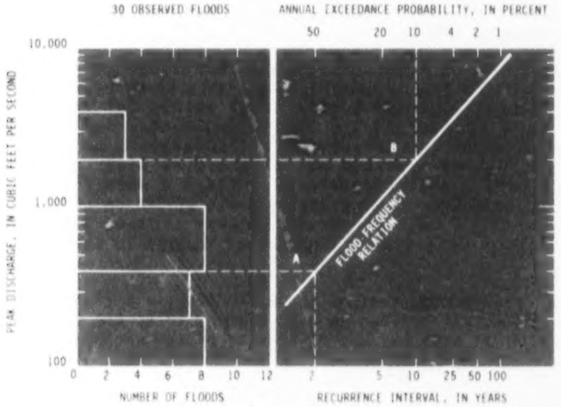


Figure 29.--Generalized flood-frequency diagram.

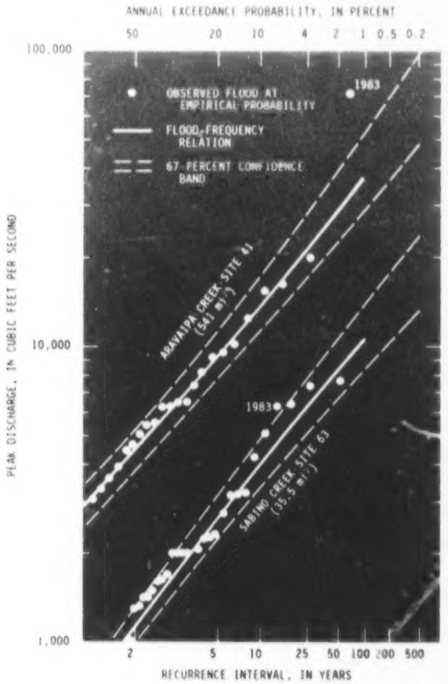


Figure 30.--Flood-frequency diagram for two sites.

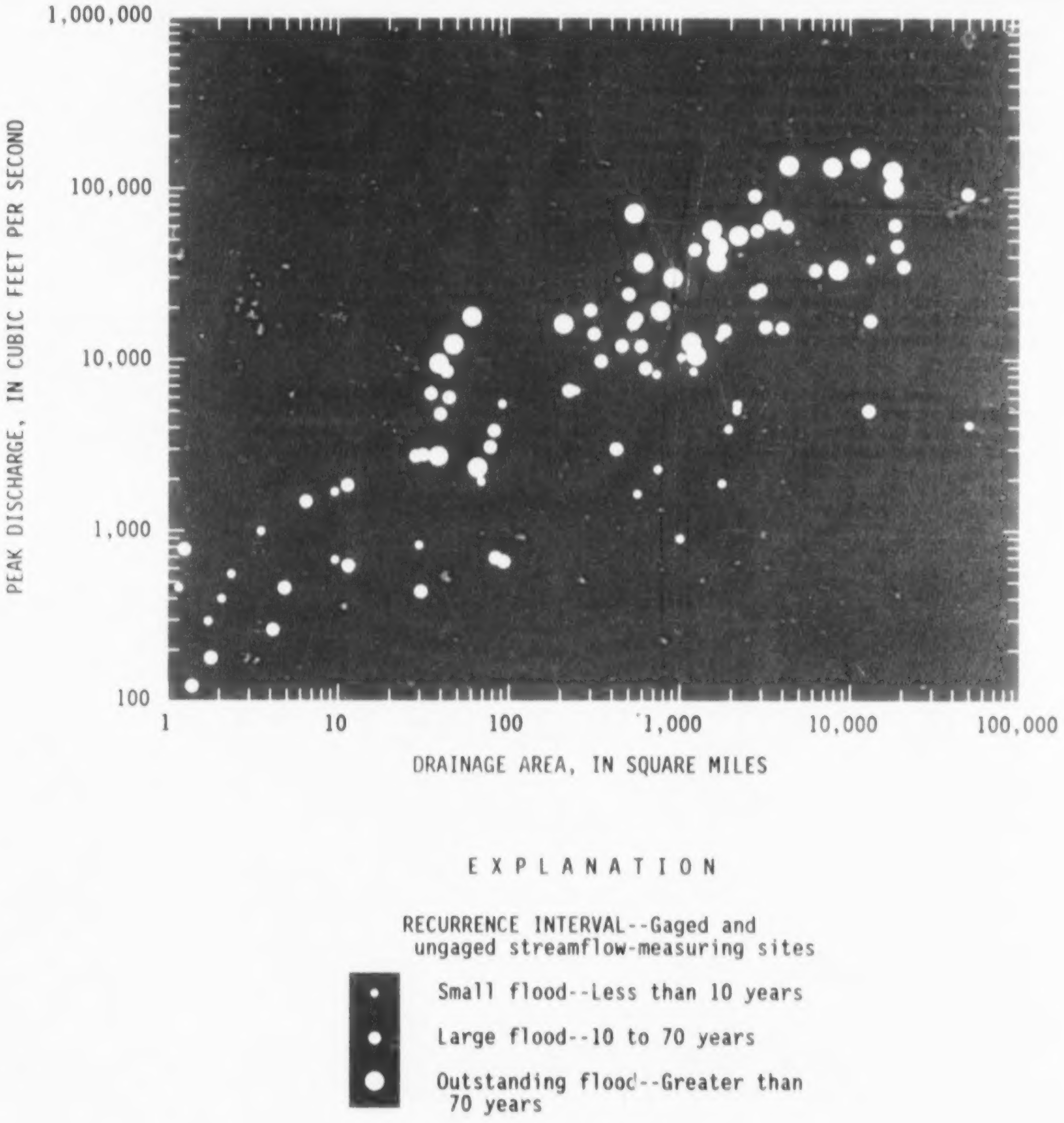


Figure 31.--Recurrence intervals of flood peaks.

Flood damage was extensive in southeastern Arizona, particularly along the San Francisco, Gila, and Santa Cruz Rivers. Eight lives were lost, and 975 injuries were reported. A major disaster area was declared on October 5, 1983, for eight Arizona counties—Cochise, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai. Yavapai County was not affected by the October floods but was included because of damages in the Prescott area that resulted from severe thunderstorms on September 23. The estimated total monetary damage in Arizona compiled by the Federal Emergency Management Agency (1983a) was $226.5 million. Agricultural damage, the largest single damage category, was estimated at $97.5 million. Cotton crops in the flood plains were severely damaged or destroyed. Large areas of farmland were eroded, irrigation systems and wells were destroyed, and huge sediment deposits were left on the flood plains.

In southwestern New Mexico, a major disaster was declared for three counties. Public damages were estimated at $1.7 million by the Federal Emergency Management Agency (1983b). The only damages to individual properties were in the village of Reserve and surrounding areas of Catron County.

Most communities on flood plains of large rivers suffered damage from inundation or erosion (fig. 32). One of the hardest hit communities was Clifton, Ariz., on the San Francisco River where about 130 homes and businesses were washed away or damaged. All the buildings on the flood plain were damaged or destroyed (fig. 33). The total estimated damage in Clifton was $9.5 million (H.W. Hjalmarson, written commun., 1986).

The Arizona Department of Transportation (unpublished data, 1983) identified 60 sites on the State's federal-aid highway system where repairs were required because of flood damage. Damage consisted of washed-out roadways, washed-out or damaged bank protection and bridge abutments, and damaged structures. The south approaches of the northbound and southbound bridges on Interstate 10 south of Phoenix were washed out at the Gila River crossing (fig. 34). The north-bound bridge on Interstate 19 collapsed when the north abutment washed out at the Santa Cruz River crossing south of Tucson (fig. 35). Interstate 8 was closed for nearly 2 days where the highway crosses the Santa Cruz River flood plain west of Casa Grande because of damage to the roadway (fig. 36).

All the highway bridge crossings on the Gila River in Safford Valley were impassable during the flood. The bridge on U.S. Highway 70 at the community of Bylas was closed for several days because of erosion of the south approach. In Pima County, 35 major bridges were closed during the flood, and 15 damaged bridges remained closed after the flood (fig. 37) (Pima County Department of Transportation and Flood Control District, 1984). Near the town of Maricopa, the main line of the Southern Pacific Railroad was closed for 5 days when floodwater from the Santa Cruz River damaged roadbeds and bridges along a 10-mile stretch of track (fig. 38).

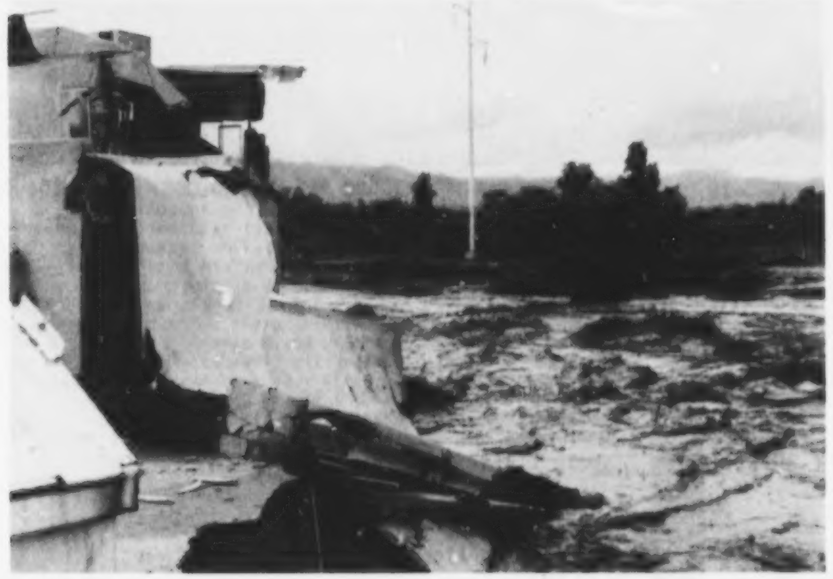


Figure 32.--Bank erosion along Rillito Creek at Tucson, Ariz., October 2, 1983. View shows bank collapse at townhouse development on Country Club Road. Direction of flow is from right to left.

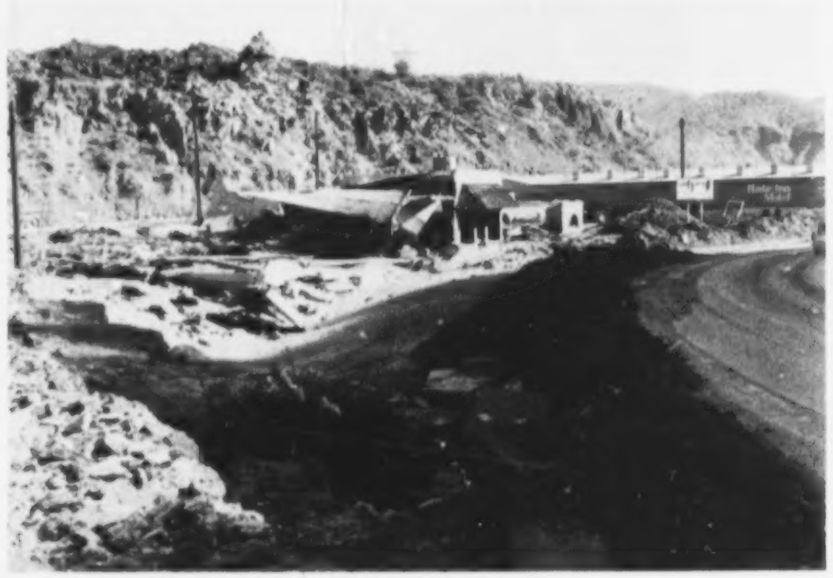


Figure 33.--Flood-plain damage along San Francisco River at Clifton, Ariz., October 8, 1983. View is downstream. San Francisco River is against the cliff.

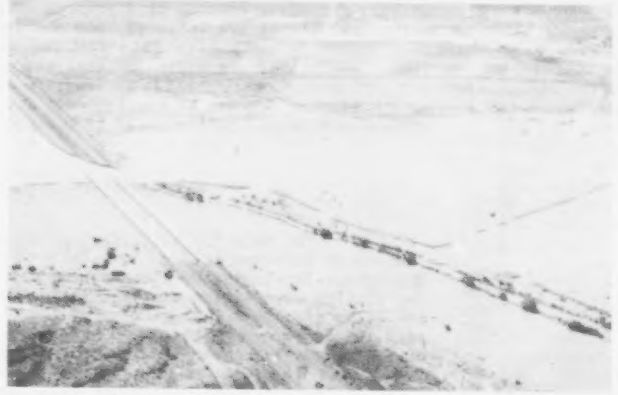


Figure 34.--Interstate 10 bridges over the Gila River, October 4, 1983. View is looking south. Direction of flow is from left to right.

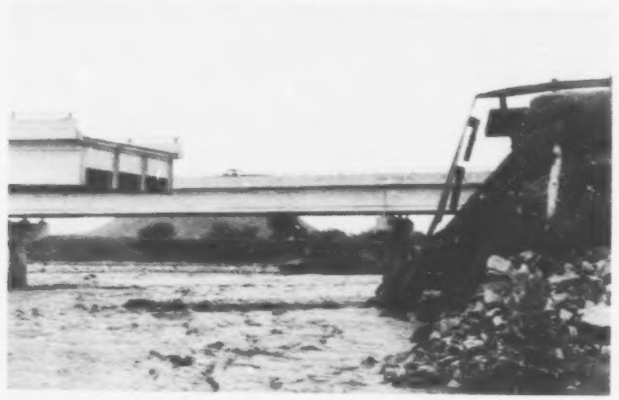


Figure 35.--Interstate 19 crossing of the Santa Cruz River, October 3, 1983. View is downstream and shows missing span on northbound bridge.

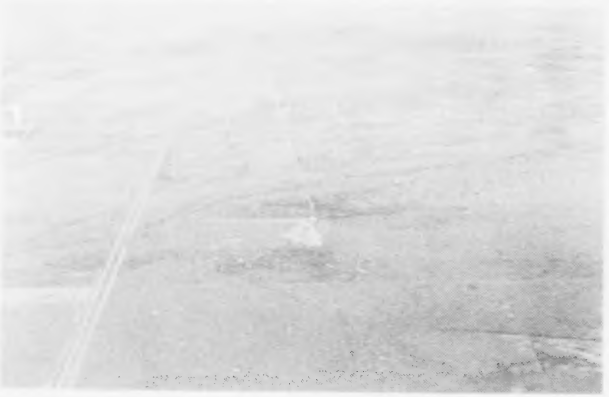


Figure 36.--Interstate 8 at the Santa Cruz River, October 3, 1983. View is east toward the Casa Grande Mountains. Damage to the east-bound roadway is visible. Direction of flow is from right to left.

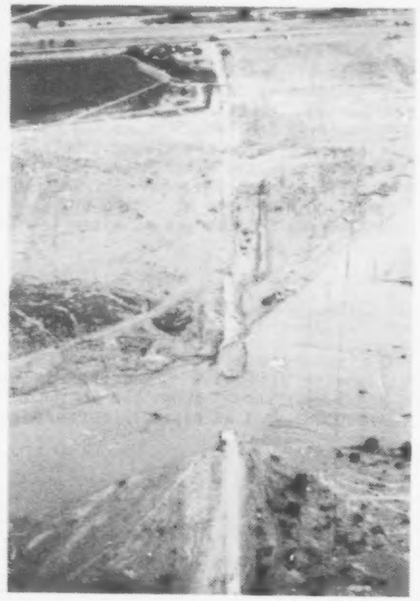


Figure 37.--Santa Cruz River at Cortaro Road bridge, October 4, 1983. View is east toward Interstate 10. Direction of flow is from right to left. East approach has been washed out, and east abutment is surrounded by water.

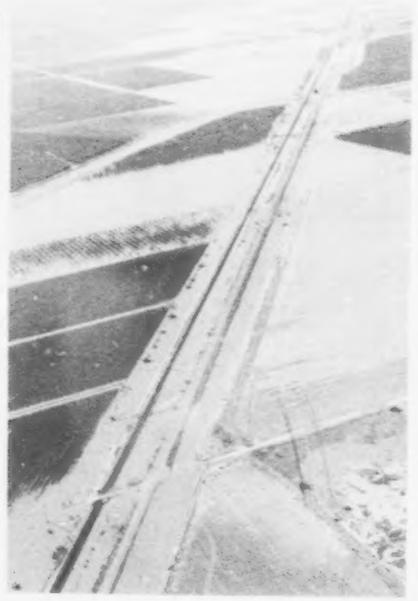


Figure 38.--Santa Cruz River flood near Maricopa, Ariz., October 4, 1983. View is along the Southern Pacific Railroad. Maricopa is in the distance. Flow is from left to right. Photograph courtesy of Cella, Barr and Associates.

Explanation of Data

Detailed flood information given in this report for gaging stations and miscellaneous sites is in addition to that published in the regular annual reports of the U.S. Geological Survey. Sites are numbered consecutively in downstream order, and numbers identify the locations on figures 2, 10, 14, 15, 18, and table 7. Permanent station numbers for the gaging stations correspond to those used and explained in the annual reports "Water Resources Data for Arizona" (White and Garrett, 1987) and "Water Resources Data for New Mexico" (Denis and others, 1985). Records of stage and discharge at gaging stations, contents of reservoirs and reservoir systems, and peak discharges at miscellaneous sites are given.

Summary of Flood Stages and Discharges

Maximum stages and discharges at continuous-recording stations, crest-stage stations, and miscellaneous sites are summarized in table 7. The first column under "maximum previously known" shows the period of known floods prior to September 1983. The period does not necessarily correspond to that in which continuous records of discharge were obtained; where available, records of historical floods are included, and overlapping time periods may be shown. The next three columns give data for the maximum known discharge and gage height. Separate listings are given for stations where maximum discharge and gage height did not occur concurrently. Separate listings also are given for periods that have different degrees of regulation. The last four columns present data for the maximum discharge, September 27 to October 3, 1983.

Data for Individual Sites

The data for individual sites are at the end of the report following "Selected References" and consists of a station description and may include a hydrograph for indicated times during the rise and recession of the flood peak. The station description contains information on location, drainage area, and type and datum of gage. The method used to determine the gage height during the flood period and the definition of the stage-discharge relation are explained. The maximum stage and (or) discharge for the floods of September 27 to October 3, 1983, and the highest previous flood known at each station are given. Precipitation data and hydrograph data, which consist of tables of gage heights and discharges at indicated times, are in Appendix A.

Table 7.--Summary of flood stages and discharges

Location number shown on figure 2	Station number	Stream and place of determination	Drainage area, in square miles	Maximum previously known				Maximum for flood period			
				Period	Year	Gage height, in feet	Discharge, in cubic feet per second	Date	Gage height, in feet	Discharge, in cubic feet per second	Recurrence interval (years)
1	09383400	Little Colorado River at Greer, Ariz.	30.9	1960-83	1972	5.65	615	10-02-83	4.78	440	10
2	09383500	Nutrioso Creek above Nelson Reservoir, near Springerville, Ariz.	83.4	1967-83	1978	10.84	462	10-02-83	12.28	700	25
3	09384000	Little Colorado River above Lyman Lake, near St. Johns, Ariz.	747	1900-83	1940	17.1	16,000	10-02-83	6.90	2,330	5
4	09430500	Gila River near Gila, N. Mex.	1,864	1928-83	1978	12.5	32,400	10-02-83	8.65	15,000	25
5	09430600	Mogollon Creek near Cliff, N. Mex.	69.0	1967-83	1967	13.7	10,800	10-02-83	6.50	1,920	3
6	09430900	Duck Creek at Cliff, N. Mex.	228	1957-83	1967	11.09	6,900	10-02-83	10.68	6,600	10
7	09431500	Gila River near Redrock, N. Mex.	2,829	1905-83	1978	29.8	48,800	10-02-83	19.26	24,800	25
8	09432000	Gila River below Blue Creek, near Virden, N. Mex.	3,203	1891-1983	1978	29.00	58,700	10-02-83	13.8	15,500	15
9	09442000	Gila River near Clifton, Ariz.	4,010	1891-1983	1978	23.80	57,000	10-02-83	13.8	15,300	10
10	09442630	Nail Hollow near Luna, N. Mex.	4.20	1970-83	1972	3.90	145	10-02-83	4.35	264	40
11	09442660	Trout Creek at Luna, N. Mex.	31.9	1954-83	1972	4.47	2,250	10-02-83	4.93	2,790	40
12	09442680	San Francisco River near Reserve, N. Mex.	350	1959-83	1972	[1]8.05	[1]7,000	10-01-83	11.71	9,830	70
13	--------	S. U. Canyon at New Mexico Highway 12, near Reserve, N. Mex.	28.8	---------	----	--------	------------	10-02-83	--------	2,760	70
14	09442692	Tularosa River above Aragon, N. Mex.	94	1967-83	1971	3.13	[1]312	10-02-83	3.90	660	15
15	09442695	Negro Canyon at Aragon, N. Mex.	9.62	1958-83	1959	11.60	5,200	10-02-83	4.01	670	7
16	09442740	Tularosa River near Reserve, N. Mex.	426	1956-83	1956	--------	2,280	10-02-83	9.80	3,020	35
17	--------	Cottonwood Canyon at U.S. Highway 180, near Reserve, N. Mex.	11.5	---------	----	--------	------------	10-02-83	--------	1,850	40
18	09443000	San Francisco River near Alma, N. Mex.	1,546	1904-14 1964-83	1972	18.16	30,600	10-02-83	21.44	56,600	100
19	09444000	San Francisco River near Glenwood, N. Mex.	1,653	1928-83	1972	16.61	24,000	10-02-83	20.8	37,100	>100
20	09444100	Campbell Blue Creek near Alpine, Ariz.	11.6	1958-83	1972	5.50	342	10-02-83	6.90	619	70
21	--------	East Fork Castle Creek near Alpine, Ariz.	1.82	1956-83	1978	--------	255	10-01-83	--------	170	25
22	--------	West Fork Castle Creek near Alpine, Ariz.	1.41	1956-83	1978	--------	139	10-01-83	--------	181	25
23	09444200	Blue River near Clifton, Ariz.	506	1885-1983	1972	22.56	30,000	10-01-83	21.0	24.300	25
24	09444500	San Francisco River at Clifton, Ariz.	2,766	1870-1983	1906	--------	70,000	10-02-83	19.72	90,900	70
25	09447000	Eagle Creek above pumping plant, near Morenci, Ariz.	613	1932-83	1978	12.5	24,500	10-02-83	13.04	36,400	100
26	09447800	Bonita Creek near Morenci, Ariz.	302	1981-83	1981	5.6	1,340	10-02-83	17.3	19,400	40
27	09448500	Gila River at head of Safford Valley, near Solomon, Ariz.	7,896	1906-83	1916 1978	[2]15.89 14.40	100,000 100,000	10-02-83	20.8	132,000	90
28	09456800	San Simon River at Tanque, Ariz.	1,953	1982-83	1982	8.00	2,160	10-02-83	10.35	3,940	2
29	--------	San Simon River at barrier detention dam, near Solomon, Ariz	2,189	---------	----	--------	------------	10-02-83	2.80	5,010	3
30	09457000	San Simon River near Solomon, Ariz.	2,192	1880-1983	1931	19.0	27,500	10-02-83	19.8	5,500	3
31	09466500	Gila River at Calva, Ariz.	11,470	1906-83	1916 1978	-------- 15.2	100,000 100,000	10-03-83	23.1	150,000	100
32	09468500	San Carlos River near Peridot, Ariz.	1,026	1930-83	1941	11.4	40,600	10-02-83	9.45	11,100	3
33	09469000	San Carlos Reservoir at Coolidge Dam, Ariz.	12,886	1928-83	1980	2,520.3	[3]1,090,000	10-07-83	2,514.1	[3]967,000	---
34	09469500	Gila River below Coolidge Dam, Ariz.	12,886	1914-28 [4]1928-83	1916 1980	-------- 8.95	130,000 2,700	10-06-83	10.7	5,020	10
35	09470000	Gila River at Winkelman, Ariz.	[5]13,268	1942-83	1944	[2]18.40	55,000	10-02-83	16.0	17,000	10
36	09470500	San Pedro River at Palominas, Ariz.	741	1906-83 1927-83	1926 1940	23.9 --------	------------ 22,000	10-02-83	12.69	8,180	4
37	09471000	San Pedro River at Charleston, Ariz.	1,219	1906-83	1926	21.9	98,000	10-03-83	7.95	8,560	3
38	09471550	San Pedro River near Tombstone, Ariz.	1,740	1967-83	1977	11.40	24,200	10-02-83	9.2	13,600	6
39	09472000	San Pedro River near Redington, Ariz.	2,939	1906-83	1926	29.0	90,000	10-02-83	21.60	25,400	10
40	--------	Redfield Canyon Wash at Redington, Ariz.	61.2	---------	----	--------	------------	10-01-83	--------	17,600	>100

See footnotes at end of table.

Table 7.--Summary of flood stages and discharges--Continued

Location number shown on figure 2	Station number	Stream and place of determination	Drainage area, in square miles	Maximum previously known				Maximum for flood period			
				Period	Year	Gage height, in feet	Discharge, in cubic feet per second	Date	Gage height, in feet	Discharge, in cubic feet per second	Recurrenc interval (years)
41	09473000	Aravaipa Creek near Mammoth, Ariz.	541	1919-83	1919	6.30	20,000	10-01-83	16.76	70,800	>100
42	09473100	San Pedro River below Aravaipa Creek, near Mammoth, Ariz.	4,360	1906-83	1926	--------	85,000	10-01-83	17.7	135,000	>100
43	--------	Gila River at Hayden, Ariz.	[5]17,757	---------	----	--------	------------	10-02-83	--------	125,000	90
44	09474000	Gila River at Kelvin, Ariz.	[5]18,011	1911-28 [4]1928-83	1916 1930	19.5 12.6	132,000 42,800	10-02-83	33.0	100,000	80
45	--------	Gila River at U.S. Highway 89, near Florence, Ariz.	[5]18,420	---------	----	--------	------------	10-03-83	--------	61,000	70
46	--------	Gila River at State Highway 87, near Sacaton, Ariz.	[5]18,885	---------	----	--------	------------	10-03-83	--------	46,000	70
47	09479500	Gila River near Laveen, Ariz.	[5]20,615	1940-83	1941 1978	-------- 10.20	11,900 ------------	10-04-83	12.08	[6]35,000	60
48	09480000	Santa Cruz near Lochiel, Ariz.	82.2	1949-83	1977	10.21	12,000	10-02-83	8.22	3,880	10
49	09480500	Santa Cruz River near Nogales, Ariz.	533	1892-1983	1977	15.5	31,000	10-02-83	12.40	16,200	25
50	--------	Ephraim Canyon Wash near Nogales, Ariz.	6.55	---------	1980	--------	2,160	10-01-83	--------	1,480	20
51	--------	Potrero Creek at mouth, near Nogales, Ariz.	91.4	1977-83	1977	--------	9,300	10-01-83	--------	5,500	7
52	09481500	Sonoita Creek near Patagonia, Ariz.	209	1930-83	1946	13.0	14,000	10-02-83	13.7	16,000	100
53	--------	Agua Fria Canyon near Rio Rico, Ariz.	40.2	---------	1977	--------	10,200	10-01-83	--------	4,820	15
54	--------	Peck Canyon near Rio Rico, Ariz.	47.8	---------	1967	--------	7,000	10-01-83	--------	12,100	>100
55	09482000	Santa Cruz River at Continental, Ariz.	1,682	1892-1983	1977	16.70	26,500	10-02-83	16.34	45,000	>100
56	09482200	Flato Wash near Sahuarita, Ariz.	30.1	1928-83	1955	11.00	4,550	10-01-83	5.37	820	3
57	09482485	Cholla Wash at Tucson, Ariz.	1.27	1982-83	1982	3.45	1,470	10-01-83	1.74	764	20
58	09482500	Santa Cruz River at Tucson, Ariz.	2,222	1892-1983	1977	21.8	23,700	10-02-83	22.2	52,700	>100
59	09483042	Cemetery Wash at Tucson, Ariz.	1.17	1966-83	1968	4.95	600	10-02-83	4.26	456	5
60	09483045	Flowing Wells Wash at Tucson, Ariz.	3.53	1971-83	1982	8.30	1,470	10-02-83	6.74	984	4
61	09483100	Tanque Verde Creek near Tucson, Ariz.	43	1960-83	1981	6.7	6,700	10-02-83	7.39	8,600	50
62	09483250	Rob Wash at Tucson, Ariz.	2.08	1971-83	1982	4.83	1,900	10-02-83	2.49	396	3
63	09484000	Sabino Creek near Tucson, Ariz.	35.5	1932-83	1970	10.21	7,730	10-01-83	5.6	6,300	25
64	09484530	Craycroft Wash Tributary near Tucson, Ariz.	0.04	1982-83	1982	1.04	9.5	10-02-83	1.52	28	2
65	09484533	Craycroft Wash near Tucson, Ariz.	2.37	1982-83	1982	3.74	580	10-02-83	3.67	557	5
66	09484600	Pantano Wash near Vail, Ariz.	457	1930-83	1958	24.00	38,000	10-01-83 or 10-02-83	15.25	12,000	10
67	09485000	Rincon Creek near Tucson, Ariz.	44.8	1953-83	1971	10.50	9,660	10-02-83	8.80	5,640	15
68	09485450	Pantano Wash at Broadway Blvd., at Tucson, Ariz.	599	[7]1930-83	1958	[2]7.50	20,000	10-02-83	8.60	11,000	10
69	09485570	Alamo Wash at Tucson, Ariz.	9.56	1976-83	1982	6.56	3,310	10-01-83	4.61	1,680	3
70	09485900	Pima Wash near Tucson, Ariz.	4.93	1964-83	1964	11.12	195	10-01-83	17.2	460	30
71	09486000	Rillito Creek near Tucson, Ariz.	918	1915-83	1929	24.0	24,000	10-02-83	--------	29,700	>100
72	09486050	Roller Coaster Wash near Tucson, Ariz.	1.75	1982-83	1983	5.90	960	10-01-83	3.69	291	3
73	09486300	Canada del Oro near Tucson, Ariz.	250	[7]1950-83	1959	--------	17,000	10-01-83 or 10-02-83	5.94	6,600	4
74	09486500	Santa Cruz River at Cortaro, Ariz.	3,503	1935-83	1977	15.6	23,000	10-02-83	16.57	[6]65,000	>100
75	09487000	Brawley Wash near Three Points, Ariz.	776	1955-83	1970	15.8	13,200	10-01-83 or 10-02-83	12.07	19,100	100
76	09487250	Los Robles Wash near Marana, Ariz.	1,170	1885-1983	1962	--------	32,000	10-02-83 or 10-03-83	11.7	12,500	80
77	09488500	Santa Rosa Wash near Vaiva Vo, Ariz.	1,782	1955-83	1962	16.9	53,100	10-04-83	--------	[8]1,890	2
78	09489000	Santa Cruz River near Laveen, Ariz.	8,581	1940-83	1962	17.50	9,200	10-04-83	19.74	[6]33,000	>100
79	09489100	Black River near Maverick, Ariz.	315	1963-83	1972	8.99	11,100	10-01-83	9.78	14,100	40
80	09489500	Black River below pumping plant, near Point of Pines, Ariz.	560	1954-83	1972	18.0	17,900	10-02-83	17.3	17,300	40

See footnotes at end of table.

Table 7.--Summary of flood stages and discharges--Continued

Location number shown on figure 2	Station number	Stream and place of determination	Drainage area, in square miles	Maximum previously known				Maximum for flood period			
				Period	Year	Gage height, in feet	Discharge, in cubic feet per second	Date	Gage height, in feet	Discharge, in cubic feet per second	Recurrence interval (years)
81	09490500	Black River near Fort Apache, Ariz.	1,232	1912-83	1916	--------	[9]50,000	10-02-83	24.80	44,200	15
					1978	24.05	40,200				
82	09491000	North Fork White River near McNary, Ariz.	66	1946-83	1946	5.36	1,290	10-02-83	6.78	2,310	100
83	09492400	East Fork White River near Fort Apache, Ariz.	38.8	1958-83	1967	3.63	758	10-01-83	5.40	2,700	>100
84	09494000	White River near Fort Apache, Ariz.	632	1958-83	1978	15.71	14,600	10-02-83	12.56	9,410	15
85	09497500	Salt River near Chrysotile, Ariz.	2,849	1906-83	1916	18	74,000	10-02-83	15.84	56,600	20
86	09498500	Salt River near Roosevelt, Ariz.	4,306	1906-83	1941	--------	117,000	10-02-83	22.80	59,800	10
					1978	29.35	------------				
87	09501000	Reservoir system on Salt River, at and below Roosevelt Dam, Ariz.	6,211	1910-83	1941	--------	[3]1,764,000	10-03-83	--------	[3]1,610,000	---
88	09502000	Salt River below Stewart Mountain Dam, Ariz.	6,232	[4]1930-83	1980	25.0	75,200	10-02-83	17.5	33,300	15
89	09512190	Salt River at 24th Street, at Phoenix, Ariz.	13,263	1891-1983	1891	--------	[10]300,000	10-02-83	7.00	38,700	5
90	09519500	Gila River below Gillespie Dam, Ariz.	[5]49,650	1891-1910	1891	--------	250,000	10-05-83	15.37	95,200	15
				[11]1921-83	1980	18.81	-------------				
91	--------	Painted Rock Reservoir at Painted Rock Dam, Ariz.	[5]50,910	1959-83	1979	647.80	[3]1,848,000	10-24-83	606.02	[3]528,600	---
92	09519800	Gila River below Painted Rock Dam, Ariz.	[5]50,910	1959-83	1983	--------	9,190	11-07-83	9.76	4,000	7
					1979	10.57	-------------				
93	09535100	San Simon Wash near Pisinimo, Ariz.	569	1972-83	1976	10.82	12,500	10-02-83	7.62	1,700	3
94	09535300	Vamori Wash at Kom Vo, Ariz.	1,250	1972-83	1972	9.44	1,880	10-03-83	10.54	10,400	100
95	09537200	Leslie Creek near McNeal, Ariz.	78.1	1970-77 1982-83	1971	5.78	1,760	10-02-83	7.33	3,130	10
96	09537500	Whitewater Draw near Douglas, Ariz.	1,023	1916-20	1955	--------	5,060	09-30-83	9.68	891	<2
				1930-83	1966	16.55	------------				

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[1] Revised.
[2] Site and datum then in use.
[3] Contents in acre-ft.
[4] Regulated.
[5] An area of 12,800 mi² above Coolidge Dam did not contribute to flooding downstream from the dam.
[6] Estimated on basis of flood routing.
[7] Most likely period.
[8] Computed on basis of inflow to Lake St. Clair, which is equivalent to unregulated flow at Santa Rosa Wash.
[9] Estimated on basis of records for Salt River near Chrysotile.
[10] Estimated on basis of records for former station at Arizona Dam 22 mi upstream.
[11] See "Station Data" for regulation.

Severe flooding occurred in the Gila River basin in southeastern Arizona and part of western New Mexico in October 1983. Flood peaks occurred at many gaging stations on October 1 and 2 in response to intense rainfall during those mornings. Floods occurred on many large rivers because rain fell over a large area and caused runoff from entire watersheds. The most intense rain fell after the ground was saturated and runoff was already underway.

The San Francisco River was the major source of flood runoff in the Gila River above Coolidge Dam. On the San Francisco River at Clifton, peak discharge was the largest since at least 1870. Downstream from the San Francisco River, the peak discharge on the Gila River was the largest since at least 1906. The peak discharge was 150,000 ft^3/s just upstream from San Carlos Reservoir where floodwaters were stored. Downstream from the reservoir, a flood of nearly equal magnitude entered the Gila River from the San Pedro River. The flood on the Santa Cruz River was the largest on record from Continental to the confluence with the Gila River. At Tucson, where the record began in 1915, the peak discharge of 52,700 ft^3/s was 2.2 times greater than the previous maximum peak discharge.

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(1) 09383400 Little Colorado River at Greer, Ariz.
(Former gaging station)

Location.--Lat 34°01'00", long 109°27'24", in NE¼SE¼ sec.11, T.7 N., R.27 E., Apache County, Hydrologic Unit 15020001, in Apache-Sitgreaves National Forest, on upstream side of right abutment of culverts on State Highway 373, at Greer, 0.1 mi downstream from Filler ditch.

Drainage area.--30.9 mi².

Gage-height record.--None. Datum of gage is 8,283 ft, NGVD of 1929.

Discharge record.--Stage-discharge record extended above 150 ft³/s on basis of partially estimated culvert computation of peak flow.

Maxima.--September-October 1983: Discharge, 440 ft³/s Oct. 2, gage height, 4.78 ft from inside high-water mark.
1960 to August 1983: Discharge, 615 ft³/s Oct. 20, 1972, gage height, 5.65 ft.

(2) 09383500 Nutrioso Creek above Nelson Reservoir, near Springerville, Ariz.
(Former gaging station)

Location.--Lat 34°01'49", long 109°11'09", in NE¼SW¼ sec.4, T.7 N., R.30 E., Apache County, Hydrologic Unit 15020001, in Apache-Sitgreaves National Forest, on right bank 2.4 mi upstream from dam on Nelson Reservoir and 9 mi southeast of Springerville.

Drainage area.--83.4 mi².

Gage-height record.--None. Datum of gage is 7,421.7 ft.

Discharge record.--Stage-discharge record extended above 130 ft³/s on basis of slope-area measurement of peak flow.

Maxima.--September-October 1983: Discharge, 700 ft³/s Oct. 2, gage height, 12.28 ft from inside high-water mark.
1967 to August 1983: Discharge, 462 ft³/s Dec. 18, 1978, gage height, 10.84 ft.

(3) 09384000 Little Colorado River above Lyman Lake, near St. Johns, Ariz.

Location.--Lat 34°18'52", long 109°21'42", in SW¼SE¼ sec.27, T.11 N., R.28 E., Apache County, Hydrologic Unit 15020001, on left bank 0.75 mi downstream from Coyote Creek, 6 mi upstream from Lyman Lake and 15 mi south of St. Johns.

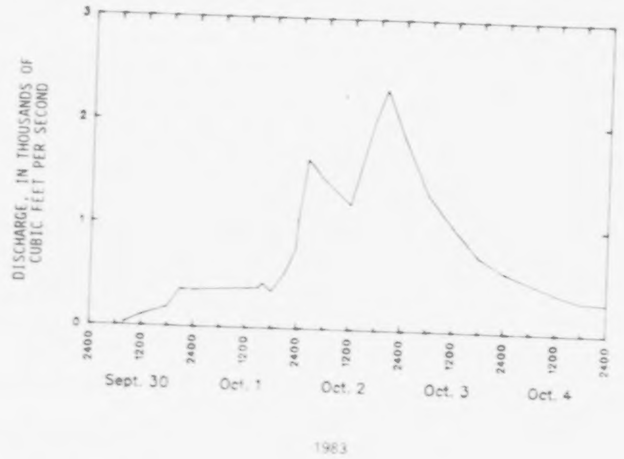
Drainage area.--747 mi².

Gage-height record.--Water-stage recorder graph and crest-stage gage. Altitude of gage is 6,010 ft from topographic map.

Discharge record.--Stage-discharge record defined by current-meter measurements below 930 ft³/s and extended above on basis of slope-area measurement of peak flow.

(3) 09384000 Little Colorado River above Lyman Lake near St. Johns, Ariz.—Continued

Maxima.--September-October 1983: Discharge, 2,330 ft³/s Oct. 2, gage height, 6.90 ft.
1900 to August 1983: Discharge, 16,000 ft³/s July 25, 1940, gage height, 17.1 ft.



(4) 09430500 Gila River near Gila, N. Mex.

Location.--Lat 33°03'40", long 108°32'12", in NE¼NW¼ sec.30, T.14 S., R.16 W., Grant County, Hydrologic Unit 15040001, on left bank at Hooker damsite, 1.6 mi upstream from Mogollon Creek, and 7 mi northeast of Gila, at mile 572.5.

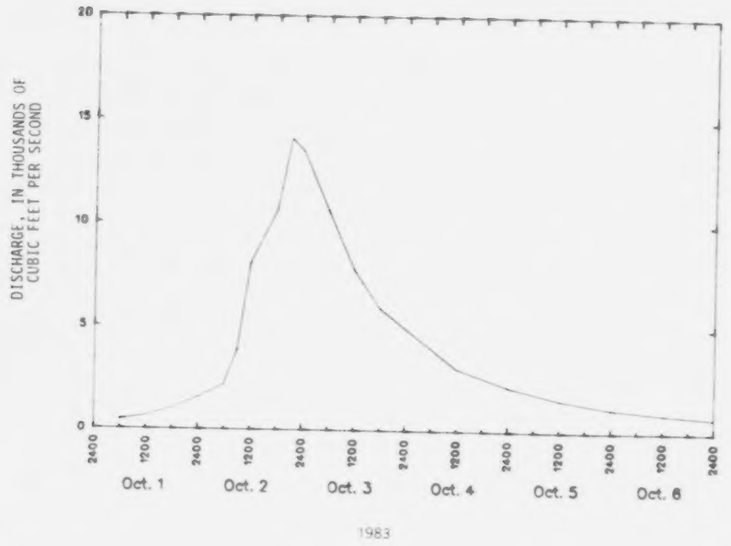
Drainage area.--1,864 mi².

Gage-height record.--Digital water-stage recorder tape. Datum of gage is 4,655.8 ft NGVD of 1929 (river-profile survey).

Discharge record.--Stage-discharge relation extended above 7,000 ft³/s on basis of slope-area measurement at gage height 12.5 ft from floodmarks.

Maxima.--September-October 1983: Discharge, 15,000 ft³/s 2115 hours, Oct. 2, gage height, 8.65 ft.
1928 to August 1983: Discharge, 32,400 ft³/s Dec. 18, 1978, gage height, 12.5 ft from floodmark from slope-area measurement of peak flow.

(4) 09430500 Gila River near Gila, N. Mex—Continued



(5) 09430600 Mogollon Creek near Cliff, N. Mex.

Location.--Lat 33°10'01", long 108°38'58", in SE¼SE¼ sec 13, T. 13 S., R. 18 W., Grant County, Hydrologic Unit 15040001, on right bank 0.3 mi downstream from Gila Wilderness Boundary, 12 mi upstream from mouth, and 14 mi north of Cliff.

Drainage area.--69 mi².

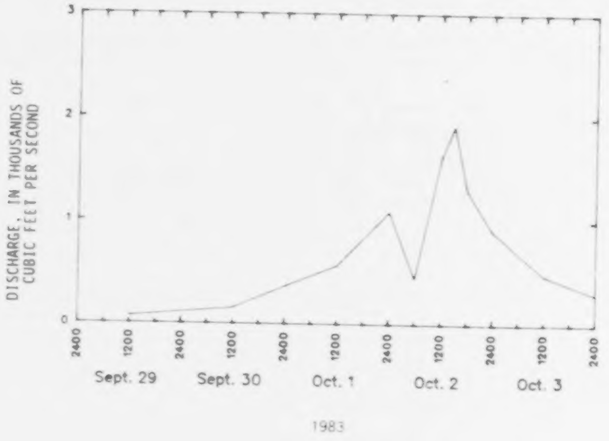
Gage-height record.--Digital water-stage recorder except 1600 hours Oct. 2 to 1200 hours Oct. 13. Altitude of gage is 5,440 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 270 ft³/s on basis of slope-area measurement of peak flow at 13.7 ft.

Maxima.--September-October 1983: Discharge, 1,920 ft³/s about 1500 hours Oct. 2, gage height, 6.50 ft from from high-water mark in well.

1967 to August 1983: Discharge, 10,800 ft³/s Aug. 12, 1967, gage height, 13.7 ft from floodmarks.

(5) 09430600 Mogollon Creek near Cliff, N. Mex.—Continued



(6) 09430900 Duck Creek at Cliff, N. Mex.
(Crest-stage station)

Location.--Lat 32°58'03", long 108°36'36", in SW¼SW¼ sec 28, T. 15 S., R. 17 W., Grant County, Hydrologic Unit 15040002, on right bank at Cliff 300 ft downstream from State Highway 211, and 0.6 mi above mouth.

Drainage area.--228 mi²

Gage-height record.--Crest stage only. Altitude of gage is 4,500 ft.

Discharge record.--Stage-discharge relation extended above 1,200 ft³/s on basis of slope-area measurements at gage heights 5.90 ft, 8.60 ft, 9.50 ft, and 10.24 ft.

Maxima.--September-October 1983: Discharge, 6,600 ft³/s Oct. 2, gage height, 10.68 ft.

1957 to August 1983: Discharge, 6,900 ft³/s Aug. 4, 1967, gage height, 11.09 ft.

Outside period of record: Olmstead (1919, facing page 71, site 2) gives a discharge of 10,600 ft³/s for the flood of Oct. 16, 1916 and 41,800 ft³/s for an earlier flood. Accuracy of estimates is unknown.

(7) 09431500 Gila River near Redrock, N. Mex.

Location.--Lat 32°43'37", long 108°40'30", in W½ sec.23, T.18 S., R.18 W., Grant County Hydrologic Unit 15040002, on left bank 0.2 mi downstream from Copper Canyon, 0.2 mi upstream from lower end of box canyon, 4.7 mi northeast of Redrock, and 14 mi downstream from Mangas Creek, at mile 539.2.

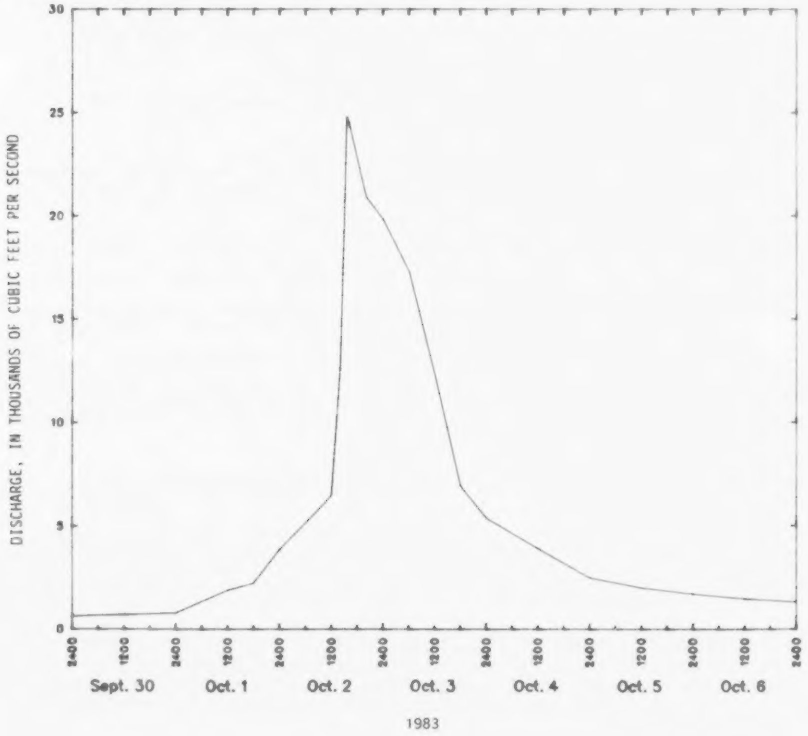
Drainage area.--2,829 mi².

Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 4,090 ft from plane-table survey.

Discharge record.--Stage-discharge relation extended above 9,500 ft³/s on basis of slope-area measurement of peak flow at gage height 29.8 ft in auxilliary gage well, outside stage 34.1 ft from floodmarks.

Maxima.--September-October 1983: Discharge, 24,800 ft³/s at 1530 hours, Oct. 2, recorded gage height, 19.26 ft in auxillary gage well.

1905 to August 1983: Discharge, 48,800 ft³/s Dec. 19, 1978, gage height 29.8 in auxilliary gage well; outside stage 34.1 ft from floodmarks.



(8) 09432000 Gila River below Blue Creek, near Virden, N. Mex.

Location.--Lat 32°38'53", long 108°50'43", in SE¼SW¼ sec.18, T.19 S., R.19 W., Grant County, Hydrologic Unit 15040002, on left bank at head of canyon, 1.4 mi downstream from Blue Creek, 10 mi east of Virden, and 16 mi upstream from New Mexico-Arizona State line at mile 523.

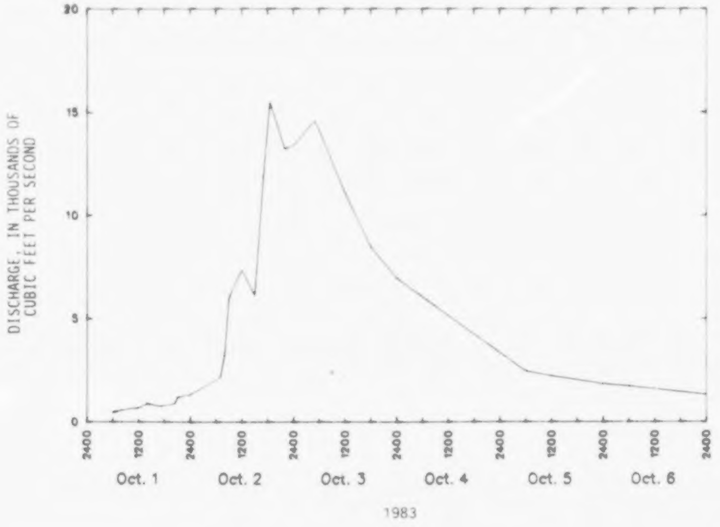
Drainage area.--3,203 mi² excluding Animas River basin.

Gage-height record.--Water-stage recorder graph from manometer gage except 0900 to 1130 hours Oct. 2 when carriage came off chain and 1830 to 1900 hours when manometer did not follow peak. Record reconstructed on basis of adjoining good record and crest-stage gage reading. Altitude of gage is 3,875 ft from river-profile map.

Discharge record.--Stage-discharge relation extended above 7,000 ft³/s on basis of slope-area measurement of peak flow. Shift adjustments following the peak are based on current-meter measurements below 1,000 ft³/s.

Maxima.--September-October 1983: Discharge, 15,500 ft³/s about 1830 hours Oct. 2, gage height, 13.8 ft.

Probably 1891 to August 1983: Discharge, 58,700 ft³/s Dec. 19, 1978, gage height, 29.00 ft.



(9) 09442000 Gila River near Clifton, Ariz.

Location.--Lat 32°57'57", long 109°18'35", in NE¼SE¼ sec.25, T.5 S., R.29 E., Greenlee County, Hydrologic Unit 15040002, on right bank 500 ft downstream from bridge on county road, 6 mi upstream from San Francisco River, and 6 mi south of Clifton at mile 471.

Drainage area.--4,010 mi².

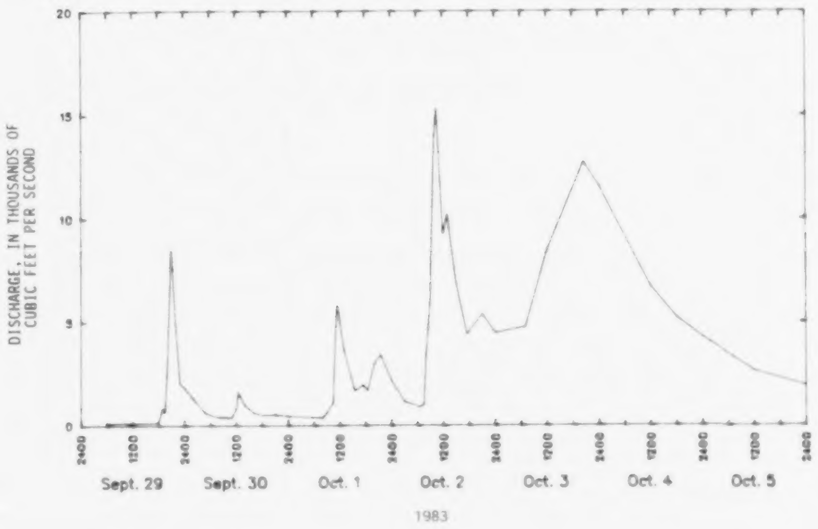
(9) 09442000 Gila River near Clifton, Ariz.—Continued

Gage-height record.--Water-stage recorder graph. Datum of gage is 3,336.38 ft NGVD of 1929 (adjusted).

Discharge record.--Base stage-discharge relation defined by current-meter measurements below 28,000 ft³/s. Negative shifts Oct. 1 and 2 are based on discharge measurements prior to the peak at 1030 hours Oct. 2.

Maxima.--September-October 1983: Discharge, 15,300 ft³/s 1030 hours, Oct. 2, gage height, 13.8 ft.

Probably 1891 to August 1983: Discharge, 57,000 ft³/s Dec. 19, 1978, gage height, 23.80 ft.



(10) 09442630 Mail Hollow near Luna, N. Mex.
(Crest-stage station)

Location.--Lat 33°47'38", long 108°56'59", in NW¼SW¼ sec. 7, T. 6 S., R. 20 W., Catron County, Hydrologic Unit 15040004, 450 ft upstream from U.S. Highway 180, and 2.3 mi south of Luna.

Drainage area.--4.20 mi².

Gage-height record.--Crest stage only. Altitude of gage is 7,100 ft from topographic map

Discharge record.--Stage-discharge relation extended above 6.0 ft³/s on basis of slope-area measurement at gage height 3.30 ft and 4.35 ft.

Maxima.--September-October 1983: Discharge, 264 ft³/s Oct. 2, gage height, 4.35 ft

1970 to August 1983: Discharge, 145 ft³/s, gage height, 3.90 ft Oct. 20, 1972.

(11) 09442660 Trout Creek at Luna, N. Mex.
(Crest-stage station)

Location.--Lat 33°50'50", long 108°59'38", in NE¼NW¼ sec. 29, T. 5 S., R. 20 W., Catron County, Hydrologic Unit 15040004, 500 ft downstream from Luna-Red Hill Road and 2.6 mi north of Luna.

Drainage area.--31.9 mi².

Gage-height record.--Crest stage only. Altitude of gage is 7,300 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 70 ft³/s on basis of slope-area measurements at gage heights 1.82 ft, 2.00 ft, 4.20 ft, and 4.77 ft.

Maxima.--September-October 1983: Discharge, 2,790 ft³/s Oct. 2, gage height, 4.93 ft.

1954 to August 1983: Discharge, 2,250 ft³/s Oct. 19, 1972, gage height, 4.47 ft.

(12) 09442680 San Francisco River near Reserve, N. Mex.

Location.--Lat 33°44'12", long 108°46'14", in NE¼NW¼SE¼ sec. 35, T. 6 S., R. 19 W., Catron County, Hydrologic Unit 15040004, on left bank 1,300 ft downstream from Rainbow Bridge Canyon, 1.7 mi northwest of Reserve, and at mile 563.1.

Drainage area.--350 mi² approximately.

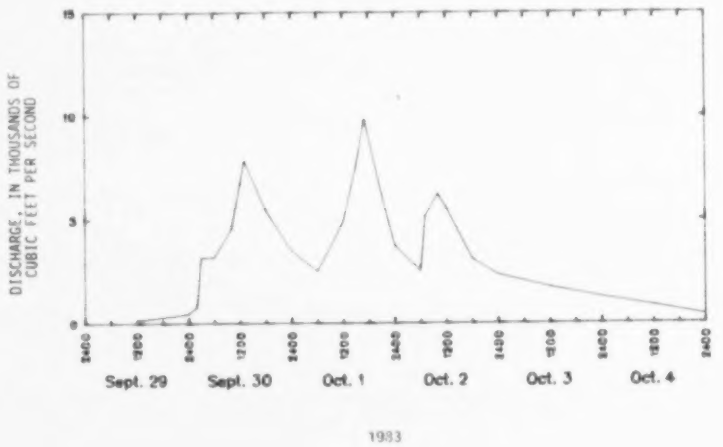
Gage-height record.--Digital water-stage recorder tape. Altitude of gage, 5,820 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 1,340 ft³/s on basis of slope-area measurement of peak flow.

Maxima.--September-October 1983: Discharge, 9,830 ft³/s 1700 hours Oct. 1, gage height, 11.71 ft from high-water mark in well.

1959 to August 1983: Discharge, 7,000 ft³/s revised, Oct. 20, 1972, gage height, 8.05 ft from outside floodmarks site and datum then in use.

Outside period of record: Stage, about 15 ft, as determined in 1962 from old floodmarks.



(13) S.U. Canyon at New Mexico Highway 12, near Reserve, N. Mex.
(Miscellaneous site)

Location.--Lat 33°43'26", long 108°47'25", in SW¼SW¼NE¼ sec.3, T.7 S., R.19 W., Catron County, Hydrologic Unit 15040004, at the mouth, and 2 mi west of Reserve.

Drainage area.--28.8 mi².

Maximum.--September-October 1983: Discharge, 2,760 ft³/s Oct. 2, from slope-area measurement of peak flow. Data furnished by State of New Mexico Highway Department.

(14) 09442692 Tularosa River above Aragon, N. Mex.

Location.--Lat 33°53'29", long 108°30'54", in NE¼NW¼ sec.9, T.5 S., R.16 W., Catron County, Hydrologic unit 15040004, on right bank 0.4 mi upstream from first diversion, 1.4 mi northeast of Aragon, and 8 mi upstream from Apache Creek.

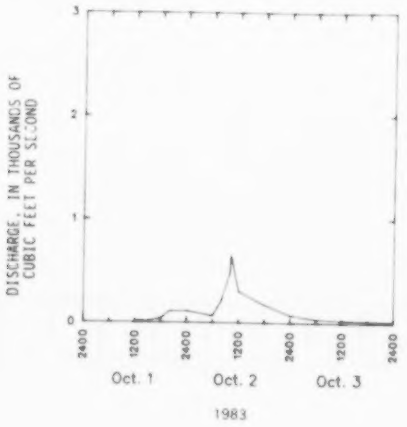
Drainage area.--94 mi².

Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 6,750 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 80 ft³/s on basis of slope-area measurement of peak flow.

Maxima.--September-October 1983: Discharge, 660 ft³/s 1015 hours Oct. 2, gage height, 3.90 ft.

1967 to August 1983: Discharge, 312 ft³/s revised, Sept. 1, 1971, gage height, 3.13 ft.



(15) 09442695 Negro Canyon at Aragon, N. Mex.
(Crest-stage station)

Location.--Lat 33°52'47", long 108°33'08", in NW¼NW¼ sec.18, T.5 S., R.16 W., Catron County, Hydrologic Unit 15040004, above culvert on State Highway 12, at west edge of Aragon.

Drainage area.--9.62 mi².

Gage-height record.--Crest stage only. Altitude of gage is 6,880 ft.

Discharge record.--Stage-discharge relation defined by computation of flow through culvert.

Maxima.--September-October 1983: Discharge, 670 ft³/s Oct. 2, gage height, 4.01 ft.
1958 to August 1983: Discharge, 5,200 ft³/s July 28, 1959, gage height, 11.60 ft.

(16) 09442740 Tularosa River near Reserve, N. Mex.
(Crest-stage station)

Location.--Lat 33°44'00", long 108°42'10", in SE¼ sec.33, T.6 S., R.18 W., Catron County, Hydrologic Unit 15040004, 150 ft west of Eagle Peak Lookout Road and 3.3 mi northeast of Reserve.

Drainage area.--426 mi².

Gage-height record.--Crest stage only. Altitude of gage is 5,950 ft.

Discharge record.--Stage-discharge relation extended above 16 ft³/s on basis of slope-area measurement at gage heights 4.35 ft, 5.76 ft, and 9.80 ft.

Maxima.--September-October 1983: Discharge, 3,020 ft³/s Oct. 2, gage height, 9.80 ft.
1956 to August 1983: Discharge, 2,280 ft³/s July 28, 1956.

Outside period of record: Olmstead (1919, facing p. 64, site 45) shows a discharge of 16,420 ft³/s at site 2 mi downstream for flood of Oct. 16, 1916 and indicates that it was the maximum known prior to 1919. Accuracy of estimate is unknown.

(17) Cottonwood Canyon at U.S. Highway 180 near Reserve, N. Mex.
(Miscellaneous site)

Location.--Lat 33°37'08", long 108°53'36", in SE¼SE¼SW¼ sec.10, T.8 S., R.20 W., Catron County, Hydrologic Unit 15040004, at the mouth, and 5.2 mi south of the junction of U.S. Highway 180 and New Mexico State Route 12.

Drainage area.--11.5 mi².

Maxima.--September-October 1983: Discharge, 1,850 ft³/s Oct. 2, from slope-area measurement of peak flow. Data furnished by State of New Mexico Highway Department.

(18) 09443000 San Francisco River near Alma, N. Mex.

Location.--Lat 33°22'05", long 108°54'35", in SW¼SE¼ sec.4, T.11 S., R.20 E., Catron County, Hydrologic Unit 15040004, on right bank 1.2 mi downstream from Alma, 4 mi northwest of Glenwood, and 6 mi upstream from Whitewater Creek, at mile 523.5.

Drainage area.--1,546 mi².

Gage-height record.--Water-stage recorder graph except 1200 hours Sept. 30 to 1500 hours Oct. 4. Gage-height record reconstructed by comparison with record at 09444000. Altitude of gage is 4,842 ft from topographic map.

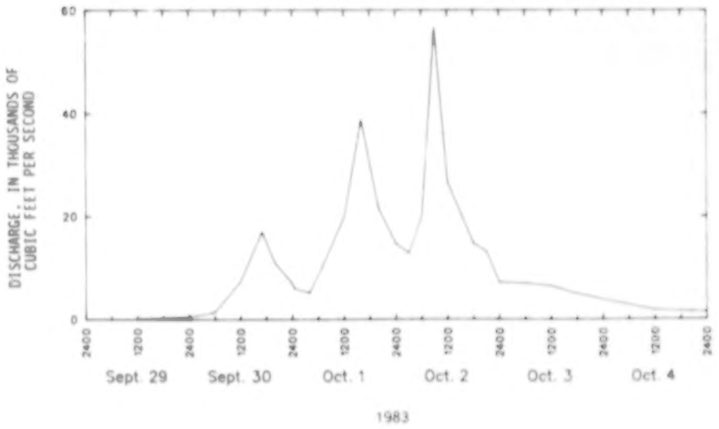
(18) 09443000 San Francisco River near Alma, N. Mex.--Continued

Discharge record.--Stage-discharge relation extended above 8,700 ft^3/s on basis of slope-area measurment at gage height 18.16 ft and 21.44 ft.

Maxima.--September-October 1983: Discharge, 56,600 ft^3/s about 0900 hours, Oct. 2, gage height, 21.44 ft from high-water mark in well.

1904-14, 1964 to August 1983: Discharge, 30,600 ft^3/s Oct. 20, 1972, gage height, 18.16 ft present datum, from floodmarks in well, and from rating curve extended above 3,500 ft^3/s on basis of slope-area measurement of peak flow.

Outside period of record: Olmstead (1919 facing page 64, site 27) gives a peak discharge of 31,800 ft^3/s for the flood of October 16, 1916, and 49,400 ft^3/s for an earlier flood (probably 1891). Accuracy of data is unknown.



(19) 09444000 San Francisco River near Glenwood, N. Mex.

Location.--Lat 33°14'48", long 108°52'47", in NE¼NW¼ sec.23, T.12 S., R.20 W., Catron County, Hydrologic Unit 15040004, on left bank 0.2 mi upstream from hot springs, 5 mi south of Glenwood, and 6 mi downstream from Whitewater Creek, at mile 511.5.

Drainage area.--1,653 mi^2.

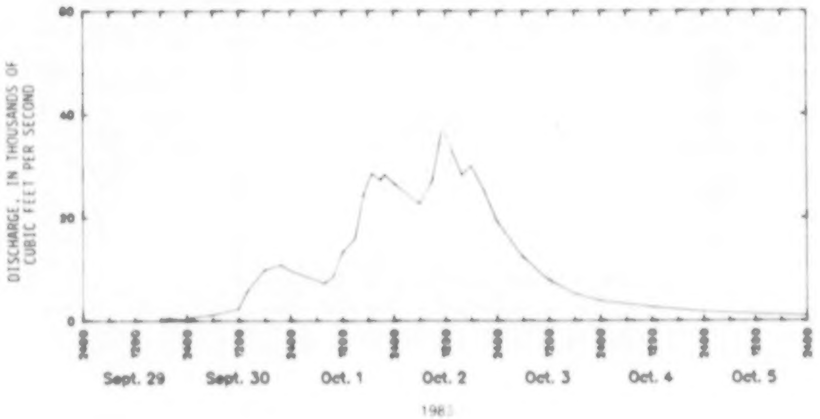
Gage-height record.--Water-stage recorder graph. Altitude of gage is 4,560 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 6,500 ft^3/s on basis of slope-area measurement at gage heights 10.74 ft, 15.6 ft, and 20.8 ft.

Maxima.--September-October 1983: Discharge, 37,100 ft^3/s 1115 hours Oct. 2, gage height, 20.8 ft.

1928 to August 1983: Discharge, 24,000 ft^3/s Oct. 20, 1972, gage height, 16.61 ft.

(19) 09444000 San Francisco River near Glenwood, N. Mex.—Continued



(20) 09444100 Campbell Blue Creek near Alpine, Ariz.
(U.S. Forest Service station)

Location.--Lat 33°44'46", long 109°12'17", in SE¼SE¼ sec.26, T.4 N., R.30 E., Greenlee County, Hydrologic Unit 15040004, Apache National Forest, 2.5 mi upstream from Coleman Creek, and 8 mi southwest of Alpine.

Drainage area.--11.6 mi^2.

Gage-height record.--Water-stage recorder tape. Altitude of gage is 7,700 ft from topographic map.

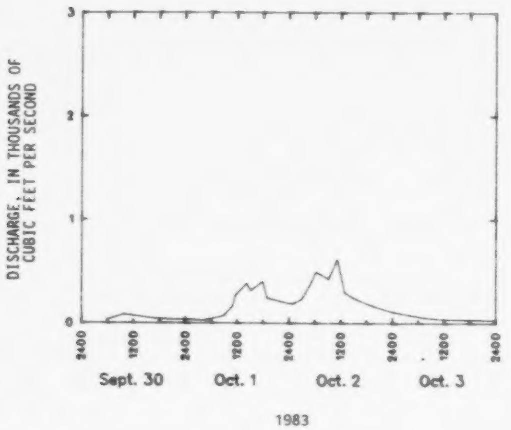
Discharge record.--Stage-discharge relation for Villemonte weir defined by model studies.

Maxima.--September-October 1983: Discharge, 619 ft^3/s 1625 hours Oct. 2, gage height, 6.90 ft.

1958 to August 1983: Discharge, 342 ft^3/s Oct. 20, 1972, gage height, 5.50 ft.

Remarks.--Discharges furnished by U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station and rounded to U.S. Geological Survey standards. Watershed is one of several small watersheds in this area.

(20) 09444100 Campbell Blue Creek near Alpine, Ariz.—Continued



(21) East Fork Castle Creek near Alpine, Ariz.
(U.S. Forest Service station)

Location.--Lat 33°42'35", long 109°10'55", in sec.7, T.4 N., R.31 E., Greenlee County, Hydrologic Unit 15040004, Apache National Forest, 12 mi south of Alpine.

Drainage area.--1.82 mi².

Maxima.--September-October 1983: Discharge, 170 ft³/s Oct. 1.
1956 to August 1983: Discharge, 255 ft³/s Nov. 24, 1978.

Remarks.--Discharge furnished by U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station.

(22) West Fork Castle Creek near Alpine, Ariz.
(U.S. Forest Service station)

Location.--Lat 33°42'36", long 109°11'05", in sec.7, T.4 N., R.31 E., Greenlee County, Hydrologic Unit 15040004, Apache National Forest, 12 mi south of Alpine.

Drainage area.--1.41 mi².

Maxima.--September-October 1983: Discharge, 181 ft³/s Oct. 1.
1956 to August 1983: Discharge, 139 ft³/s Nov. 24, 1978.

Remarks.--Discharge furnished by U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station.

(23) 09444200 Blue River near Clifton, Ariz.

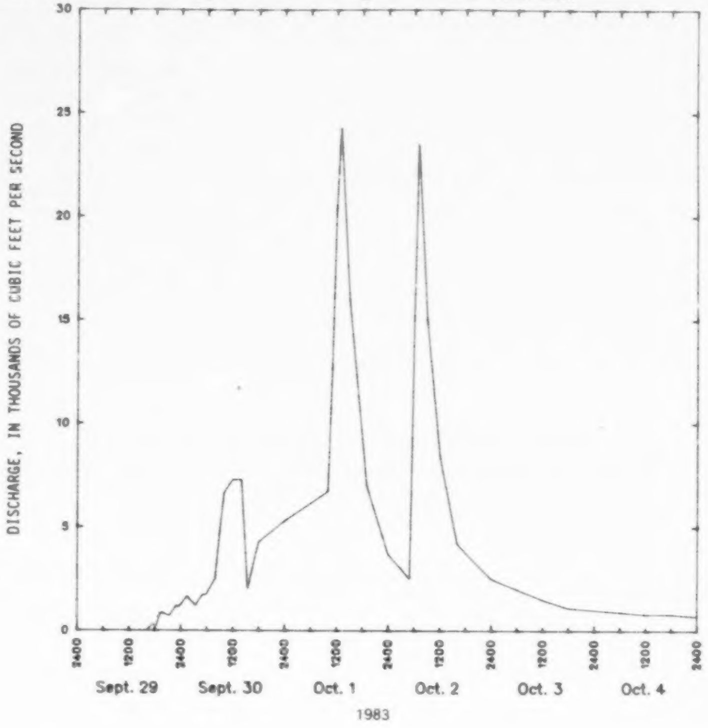
Location.--Lat 33°17'27", long 109°11'44", in sec.6, T.2 S., R.31 E. (unsurveyed), Greenlee County, Hydrologic Unit 15040004, in Apache National Forest, on right bank 0.1 mi downstream from county road crossing, 0.9 mi upstream from Clear Creek, 8 mi upstream from mouth, and 17 mi northeast of Clifton.

Drainage area.--506 mi².

Gage-height record.--Water-stage recorder graph except 1500 hours Sept. 30 to 1000 hours Oct. 1, and 1300 hours Oct. 1 to 1100 hours Oct. 6, when recorder float rested on a plug of trash in the gage well during recessions. Altitude of gage is 4,160 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 1,900 ft³/s on basis of slope-area measurement at gage height 22.56 ft. Discharge, for missing periods determined by flood routing.

Maxima.--September-October 1983: Discharge, 24,300 ft³/s 1300 hours Oct. 1, gage height, 21.0 ft.
1965 to August 1983: Discharge, 30,000 ft³/s Oct. 10, 1972, gage height, 22.56 ft. Flood of Oct. 20, 1972 appears to be the highest since at least 1885.



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(24) 09444500 San Francisco River at Clifton, Ariz.

Location.--Lat 33°02'58", long 109°17'43", in SW¼SE¼ sec.30, T.4 S., R.30 E., Greenlee County, Hydrologic Unit 15040004, on downstream side of right pier at Railroad Boulevard Bridge (U.S. Highway 666), at Clifton, 9.9 mi upstream from mouth. Supplementary water-stage recorder 0.4 mi upstream on right bank.

Drainage area.--2,766 mi^2.

Gage-height record.--Digital water-stage recorder tape and graph from manometer at supplementary gage. Datum of gage is 3,436.16 ft NGVD of 1929.

Discharge record.--Stage-discharge relation extended above 26,000 ft^3/s on basis of slope-area measurment at gage height 17.0 ft.

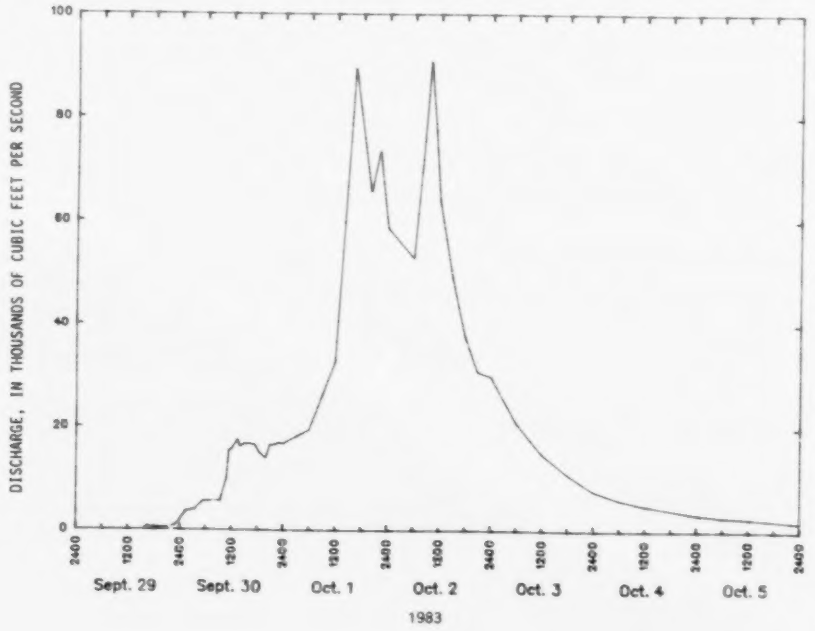
Maxima.--September-October 1983: Discharge, 90,900 ft^3/s 0945 hours Oct. 2, gage height, 19.72 ft.

1870 to August 1983: Discharge, 70,000 ft^3/s (revised) Dec. 3, 1906.

Remarks.--Discharges for the 1906 peak and several other historic peaks are either previously unpublished or were published in error. Discharges below are from Aldridge and Moosburner (written commun., 1978) and superseded those published by Olmstead (1919) and several subsequent authors.

Date	Approximate discharge		Date	Approximate discharge	
	Cubic feet per second	Cubic meters per second		Cubic feet per second	Cubic meters per second
Feb. 21, 1981 ...	65,000	1,700	Nov. 27, 1905 ...	65,000	1,840
Jan. 10, 1905 ...	60,000	1,700	Jan. 16, 1916 ...	[1] [2]59,000	1,670
Feb. 17, 1905 ...	50,000	1,420	Oct. 13, 1916 ...	[2]60,000	1,700

[1] From slope-area computation of peak flow. [2] Data revised.



(25) 09447000 Eagle Creek above Pumping Plant, near Morenci, Ariz.

Location.--Lat 33°04'12", long 109°27'05", in SE¼NE¼ sec.22, T.4 S., R.28 E., Greenlee County, Hydrologic Unit 15040005, 3 mi upstream from Phelps Dodge Corp. pumping plant, 5 mi west of Morenci, and 13 mi upstream from mouth.

Drainage area.--613 mi^2.

Gage-height record.--Water-stage recorder graph and tape to 1100 hours Oct. 1 when float tape came off wheel. Datum of gage is 3,701 ft unadjusted.

Discharge record.--Stage-discharge relation extended above 3,000 ft^3/s on basis of slope-area measurement of peak flow. Record is poor.

Maxima.--September-October 1983: Discharge, 36,400 ft^3/s, time unknown, Oct. 2, gage height, 13.04 ft from slope-area measurement of peak flow.

1932 to August 1983: Discharge, 24,500 ft^3/s Dec. 18, 1978, gage height, 12.5 ft at supplemental gage.

Peak of October 2, 1983, is probably the highest since at least 1916.

(26) 09447800 Bonita Creek near Morenci, Ariz.

Location.--Lat 32°57'20", long 109°31'50", in SE¼NW¼ sec.36, T.5 S., R.27 E., Graham County, Hydrologic Unit 15040005, on left bank 2.0 mi upstream from intake of City of Safford water supply, 6.3 mi upstream from mouth, and 12.8 mi southwest of Morenci, Arizona.

Drainage area.--302 mi^2.

Gage-height record.--Water-stage recorder graph to 1000 hours Oct. 1 when float tape came off wheel.

Discharge record.--Base stage-discharge relation defined by current-meter measurements below 550 ft^3/s and extended above on basis of slope-area measurement of peak flow. Record poor.

Maxima.--September-October 1983: Discharge, 19,400 ft^3/s, time unknown, Oct. 2, gage height, 17.3 ft from inside high-water mark.

1981 to August 1983: Discharge, 1,340 ft^3/s June 27, 1981, gage height, 5.6 ft from floodmark.

Outside period of record: A discharge of 10,000 ft^3/s occurred Dec. 20, 1972 at site about 2 mi downstream from slope-area measurement made by City of Safford.

(27) 09448500 Gila River at head of Safford Valley, near Solomon, Ariz.

Location.--Lat 32°52'06", long 109°30'38", in SE¼NE¼ sec.31, T.6 S., R.28 E., Graham County, Hydrologic Unit 15040005, on left bank 0.6 mi downstream from intake of Brown Canal, 8 mi northeast of Solomon, and 17 mi downstream from San Francisco River.

Drainage area.--7,896 mi^2.

Gage-height record.--Water-stage recorder graph to 2000 hours Sept. 29 when rock slide knocked out the station. Datum of gage is 3,064.88 ft NGVD of 1929.

Discharge record.--Base stage-discharge relation extended above 7,000 ft^3/s based on slope-area measurements at 19.36 ft and 20.8 ft. Record poor.

Maxima.--September-October 1983: Discharge, 132,000 ft^3/s, time unknown, Oct. 2; gage height, 20.8 ft from slope-area measurement of peak flow.

1906 to August 1983: Discharge about 100,000 ft^3/s Jan. 19, 1916, gage height, 15.89 ft or 4.843 present datum and Dec. 19, 1978, gage height 14.40 ft.

(28) 09456800 San Simon River at Tanque, Ariz.
(Partial-record station)

Location.--Lat 32°36'30", long 109°32'00", in NE¼SE¼ sec.36, T.9 S., R.27 E., Graham County, Hydrologic Unit 15040006, on left bank 0.1 mi east of Tanque and 15 mi southeast of Solomon.

Drainage area.--1,953 mi^2.

Gage-height record.--Crest stage only. Datum of gage is 3,259.38 ft NGVD of 1929.

Discharge record.--Stage-discharge relation extended above 637 ft^3/s on basis of a slope-conveyance estimate at 8.1 ft and slope-area measurement of peak flow.

Maxima.--September-October 1983: Discharge, 3,940 ft^3/s 0830 hours Oct. 2, gage height, 10.35 ft.
1982 to August 1983: Discharge, 2,160 ft^3/s Aug. 1, 1982, gage height, 8.00 ft.

Remarks.--Flood-warning site.

(29) San Simon River at Barrier Detention Dam near Solomon, Ariz.
(Miscellaneous site)

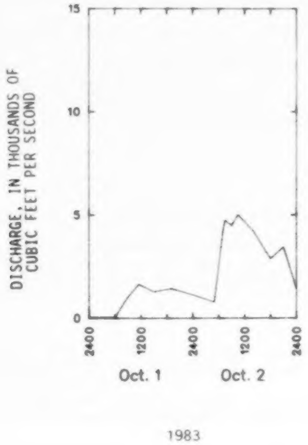
Location.--Lat 32°46'45", long 109°36'40", in NW¼SW¼ sec.32, T.7 S., R.27 E., Graham County, Hydrologic Unit 15040005, 2.5 mi southeast of Solomon.

Drainage area.--2,189 mi^2.

Gage-height record.--Water-stage recorder graph. Altitude of gage is 3,025 ft from topographic map.

Maximum.--September-October 1983: Discharge, 5,010 ft^3/s 1030 hours Oct. 2, gage height, 2.80 ft.

Remarks.--Information furnished by Bureau of Land Management in Safford.



(30) 09457000 San Simon River near Solomon, Ariz.
(Former gaging station)

Location.--Lat 32°48'06", long 109°38'19", in NW¼NE¼ sec.25, T.7 S., R.26 E., Graham Count Hydrologic Unit 15040006, 1.0 mi southwest of Solomon and 2.2 mi upstream from mouth

Drainage area.--2,192 mi^2.

Gage-height record.--None. Datum of gage is 2,960.15 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September-October 1983: Discharge, 5,500 ft^3/s 1800 hours Oct. 2, gage height 19.8 ft.
1931 to August 1983: Discharge, 27,500 ft^3/s Aug. 9, 1931, from slope-area measuremen of peak flow, gage height, 19.0 ft.
Flood of Aug. 9, 1931, is the maximum since at least the early 1880's. Olmstead (1919) gives a peak discharge of 11,960 ft^3/s for the maximum flood known prior to 1919. Date of flood unknown.

(31) 09466500 Gila River at Calva, Ariz.

Location.--Lat 33°11'08", long 110°13'10", in SW¼ sec.8, T.3 S., R.21 E. (unsurveyed), Graham County, Hydrologic Unit 15040005, in San Carlos Indian Reservation, on right upstream abutment of Southern Pacific Railroad bridge at head of San Carlos Reservoir, 2.0 mi west of Calva. Supplemental gage at downstream side of bridge.

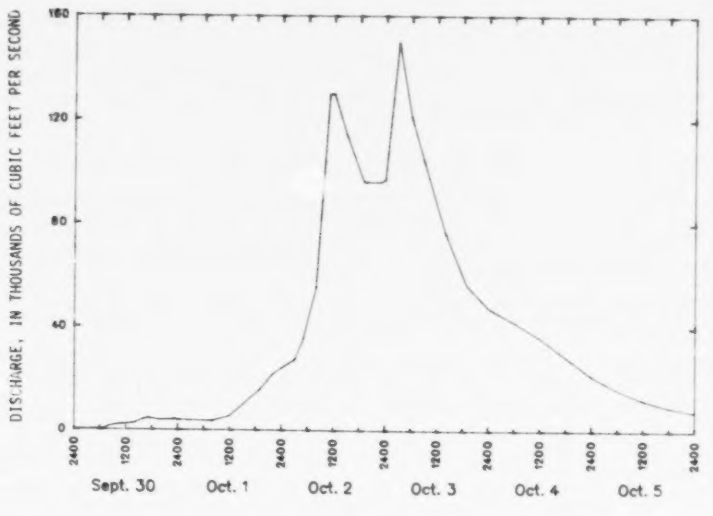
Drainage area.--11,470 mi^2.

Gage-height record.--Water-stage recorder graph except 0900 hours Oct. 2 to 0900 hours Oct. when float counter weight bottomed out in counterweight pipe. Gage-height recor reconstructed on basis of high-water mark and adjoining good record. Gage-height recor was verified by routing flow using upstream stations, Gila River at Clifton, San Francisc River at Clifton, and Eagle and Bonita Creeks near Morenci. Datum of gage is 2,517.29 f NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements belo 86,000 ft^3/s and extended above on basis of area-velocity study at 23.1 ft. Records poor

Maxima.--September-October 1983: Discharge, 150,000 ft^3/s 0300 hours Oct. 3, gage heigh 23.1 from slope-area measurment of peak flow.
1929 to August 1983: Discharge, 100,000 ft^3/s Dec. 19, 1978, gage height, 15.2 ft
Floods of February 1891, November 1905, and January 1916 probably exceeded 100,000 ft^3/s.

(31) 09466500 Gila River at Calva, Ariz.—Continued



(32) 09468500 San Carlos River near Peridot, Ariz.

Location.--Lat 33°17'47", long 110°27'03", in SE¼ sec.36, T.1 S., R.18 E. (unsurveyed), Gila County, Hydrologic Unit 15040007, in San Carlos Indian Reservation, on U.S. Highway 70, 0.9 mi south of Peridot.

Drainage area.--1,026 mi².

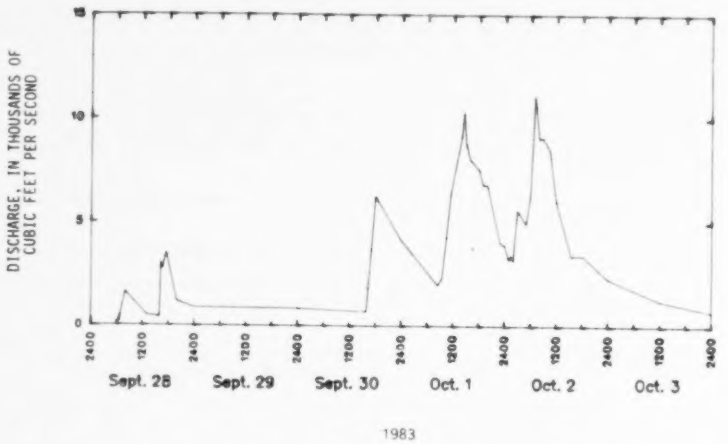
Gage-height record.--Water-stage recorder graph. Datum of gage is 2542.29 ft Arizona Department of Transportation datum.

Discharge record.--Base rating extended above 760 ft³/s on basis of contracted-opening measurement of peak flow of Dec. 22, 1965 at gage height 12.0 ft and current-meter measurements above 8.2 ft, adjusted for present site.

Maxima.--September-October 1983: Discharge, 11,100 ft³/s 0700 hours Oct. 2, gage height, 9.45 ft.

1930 to August 1983: Discharge, 40,600 ft³/s Mar. 14, 1941, gage height, 11.4 ft site and datum then in use from rating curve extended above 23,000 ft³/s on basis of rate of change in storage in San Carlos Reservoir.

(32) 09468500 San Carlos River near Peridot, Ariz.—Continued



(33) 09469000 San Carlos Reservoir at Coolidge Dam, Ariz.

Location.--Lat 33°10'32", long 110°31'38", in NW¼ sec.17, T.3 S., R.18 E. (unsurveyed), Gila County, Hydrologic Unit 15040005, in San Carlos Indian Reservation, at right intake tower of Coolidge Dam on Gila River.

Drainage area.--12,886 mi².

Gage-height record.--Gage-height record reconstructed from wire-weight readings made by U.S. Bureau of Indian Affairs personnel. Datum of gage is NGVD of 1929.

Contents.--Contents computed from capacity tables developed by San Carlos Irrigation District.

Maxima.--September-October 1983: Contents, 967,000 acre-ft Oct. 7, elevation, 2,514.1 ft.

1928 to August 1983: Contents, 1,090,000 acre-ft Feb. 28, 1980; elevation, 2,520.3 ft.

Remarks.--Reservoir is formed by concrete multiple-dome dam completed Oct. 25, 1928; storage began Nov. 15, 1928. Usable capacity, 935,000 acre-ft, from table put in use Jan. 1, 1982, between elevations 2,382.63 ft—sill of lowest outlet gate—and 2,512.3 ft—crest of spillway. Reservoir is used to store water for irrigation of San Carlos project and for power development. Flow over spillway from Oct. 4, 1983, to about Feb. 26, 1984.

Contents, in acre-feet, at 2400 hours, 1983, of San Carlos Reservoir at Coolidge Dam

Day	Contents	Day	Contents	Day	Contents	Day	Contents
Sept. 26.	547,000	Oct. 5.	960,000	Oct. 14.	951,000	Oct. 23.	937,000
27.	547,000	6.	965,000	15.	949,000	24.	935,000
28.	550,000	7.	967,000	16.	947,000	25.	935,000
29.	551,000	8.	965,000	17.	946,000	26.	935,000
30.	560,000	9.	963,000	18.	944,000	27.	935,000
Oct. 1.	596,000	10.	961,000	19.	942,000	28.	937,000
2.	735,000	11.	958,000	20.	940,000	29.	937,000
3.	877,000	12.	956,000	21.	939,000	30.	937,000
4.	937,000	13.	953,000	22.	939,000	31.	937,000

Change in contents, in acre-feet--September, -55,000; October, +377,000.

(34) 09469500 Gila River below Coolidge Dam, Ariz.

Location.--Lat 33°10'10", long 110°31'50", in SW¼ sec.17, T.3 S., R.18 E. (unsurveyed), Pinal County, Hydrologic Unit 15050100, on left bank 2,200 ft downstream from Coolidge Dam. Supplementary water-stage recorder at site 1,000 ft upstream.

Drainage area.--12,886 mi^2.

Gage-height record.--Water-stage recorder chart from supplementary gage (main gage flume exceeded capacity) except 0300 hours Oct. 5 to 1200 hours Oct. 7. Gage height record reconstructed based on high-water mark and adjoining good record. Datum of gage is 2,309.5 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurement between 1,570 ft^3/s and 4,830 ft^3/s. Record poor.

Maxima.--September-October 1983: Discharge 5,020 ft^3/s Oct. 6, gage height, 10.7 ft from high-water mark in well.

1928 to August 1983: Discharge, 2,700 ft^3/s March 10, 1980, gage height, 8.95 ft.

1914 to 1928: Discharge, 130,000 ft^3/s Jan. 20, 1916, estimated on basis of peak discharge near Solomon and at Kelvin.

Remarks.--Flow regulated by San Carlos Reservoir since Nov. 15, 1928. (See sta 09469000.) Record includes flow of Warm Springs, which enters between dam and gage.

Mean discharge, in cubic feet per second, 1983

Day	Discharge	Day	Discharge	Day	Discharge
Sept. 26	167	Oct. 8	4,780	Oct. 20	1,330
27	148	9	4,540	21	1,280
28	142	10	4,090	22	1,250
29	134	11	3,550	23	1,190
30	62	12	3,120	24	1,120
Oct. 1	14	13	2,930	25	1,030
2	18	14	2,500	26	832
3	39	15	2,200	27	783
4	929	16	1,970	28	746
5	2,900	17	1,790	29	727
6	4,800	18	1,570	30	713
7	4,960	19	1,400	31	702

Monthly mean discharge, in cubic feet per second--September, 550; October, 1,929.
Runoff, in acre-feet--September, 32,730; October, 118,600.

(35) 09470000 Gila River at Winkelman, Ariz.
(Discontinued gaging station)

Location.--Lat 33°00'06", long 110°45'55", in NW¼NE¼ sec.13, T.5 S., R.15 E., Gila County, Hydrologic Unit 15050100, on right bank 1 mi north of Winkelman, 2.2 mi upstream from San Pedro River, and 29 mi downstream from Coolidge Dam.

Drainage area.--13,268 mi^2 of which 382 mi^2 is below Coolidge Dam.

Gage-height record.--None. Datum of gage is 1,921.76 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

(35) 09470000 Gila River at Winkelman, Ariz.—Continued

Maxima.--September-October 1983: Discharge, 17,000 ft^3/s Oct. 2, gage height, 16.0 ft from floodmark.

1942 to August 1983: Discharge, 55,000 ft^3/s Aug. 9, 1944, gage height, 18.40 ft from rating curve extended above 2,900 ft^3/s on basis of slope-area measurement of peak flow.

Peak discharge, Aug. 9, 1944, is probably the highest to originate downstream from Coolidge Dam since at least 1913, but it could have been exceeded on Aug. 4, 1930.

Remarks.--Flow regulated by San Carlos Reservoir since 1928. Records of peak flow show discharge from drainage area below Coolidge Dam.

(36) 09470500 San Pedro River at Palominas, Ariz.
(Former gaging station)

Location.--Lat 31°22'48", long 110°06'38", in SW¼SE¼ sec.33, T.23 S., R.22 E., Cochise County, Hydrologic Unit 15050202, near left bank on downstream side of pier of bridge on State Highway 92, 0.7 mi east of Palominas, 2.5 mi upstream from Green Brush Draw, 4.5 mi downstream from international boundary, and 12 mi southwest of Bisbee.

Drainage area.--741 mi^2, of which 649 mi^2 is in Mexico.

Gage-height record.--Water-stage recorder graph. Datum of gage is 4,187.62 ft NGVD of 1929. (State Highway Department bench mark). Data furnished by International Boundary and Water Commission.

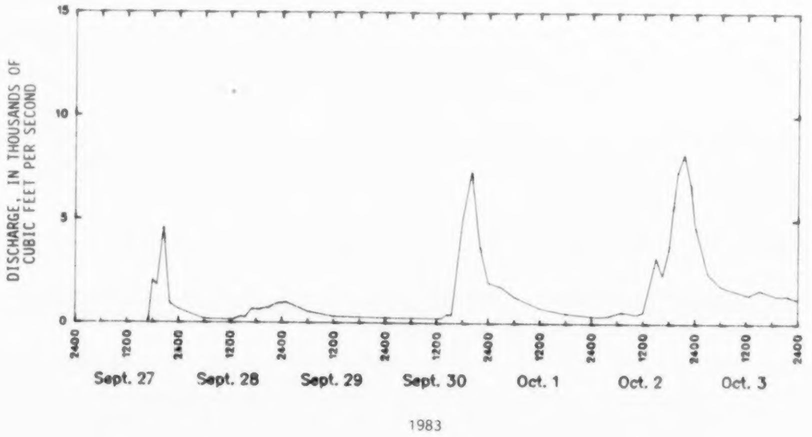
Discharge record.--Stage-discharge relation defined by current-meter measurements below 4,000 ft^3/s and extended above on basis of slope-area measurement at gage height 16.04 ft.

Maxima.--September-October 1983: Discharge, 8,180 ft^3/s 2130 hours Oct. 2, gage height, 12.69 ft.

1927 to August 1983: Discharge, 22,000 ft^3/s Aug. 14, 1940, gage height, 16.16 ft, present datum, from rating curve extended above 5,600 ft^3/s on basis of slope-area measurement of peak flow.

1906 to August 1983: Gage height, about 23.9 ft, present datum, from floodmarks; Sept. 28, 1926, discharge not determined, probably between 40,000 and 60,000 ft^3/s.

Remarks.--Flood-warning site.



(37) 09471000 San Pedro River at Charleston, Ariz.

Location.--Lat 31°37'33", long 110°10'26", in NE¼NE¼ sec.11, T.21 S., R.21 E., Cochise County, Hydrologic Unit 15050202, in Spanish land grant of San Juan de las Boquillas y Nogales, at downstream side of pier near center of highway bridge, 0.3 mi south of Charleston, 1.5 mi upstream from Charleston damsite, and 9 mi upstream from Babocomari River.

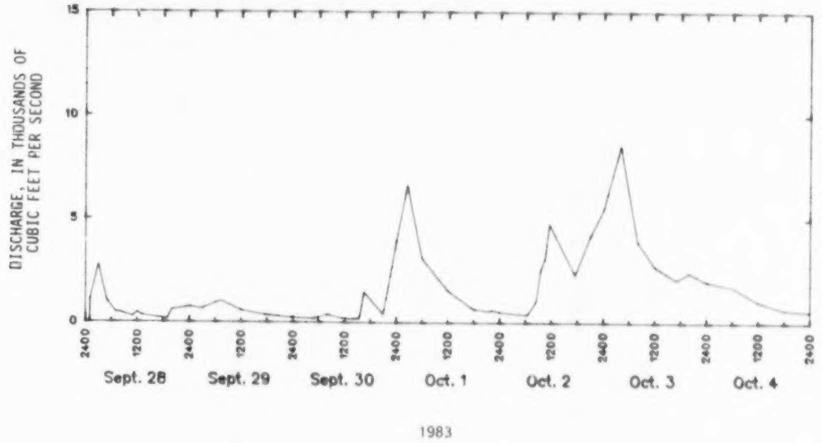
Drainage area.--1.219 mi², of which 696 mi² is in Mexico.

Gage-height record.--Water-stage recorder graph. Datum of gage is 3,954.01 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 7,600 ft³/s.

Maxima.--September-October 1983: Discharge, 8,560 ft³/s 0400 hours Oct. 3, gage height, 7.95 ft.

1906 to August 1983: Discharge, about 98,000 ft³/s Sept. 28, 1926, gage height, 21.9 ft, site and datum then in use, by slope-area measurement of peak flow.



(38) 09471550 San Pedro River near Tombstone, Ariz.

Location.--Lat 31°45'03", long 110°12'02", in SE¼ sec.28, T.19 S., R.21 E. (unsurveyed), Cochise County, Hydrologic Unit 15050202, in Spanish land grant of San Juan de las Boquillas y Nogales, on right bank 0.5 mi downstream from Willow Wash, 2.6 mi north of Fairbank, and 8 mi northwest of Tombstone.

Drainage area.--1,740 mi² approximately, of which 696 mi² is in Mexico.

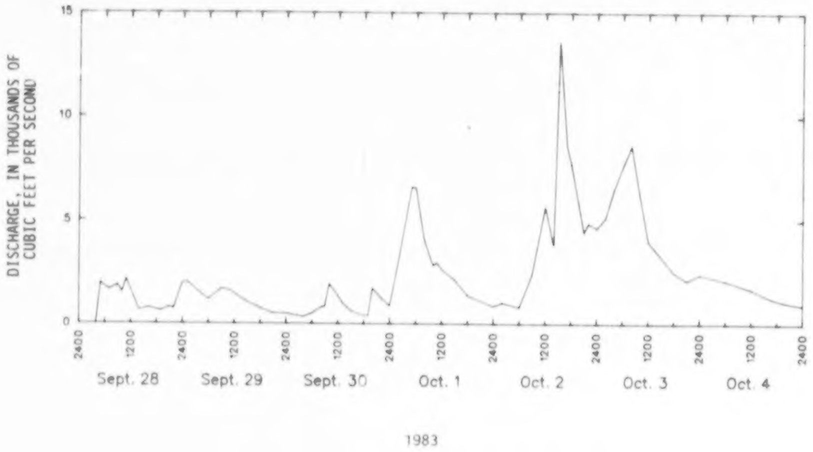
Gage-height record.--Digital water-stage recorder tape except 0400 hours Oct. 3 to 1700 hours Oct. 4. Altitude of gage is 3,780 ft, from topographic map.

Discharge record.--Average stage-discharge relation defined by current-meter measurements below 4,200 ft³/s and extended above on basis of slope-area measurements at 6.23, 8.89, and 11.40 ft. Shift adjustment curve used during flood period defined below 1,900 ft³/s. Record is fair. Discharge estimated for missing period based on upstream station 09471000.

(38) 09471550 San Pedro River near Tombstone, Ariz.—Continued

Maxima.--September-October 1983: Discharge, 13,600 ft³/s 1515 hours Oct. 2, gage height, 9.2 ft.

1967 to August 1983: Discharge, 24,200 ft³/s Oct. 9, 1977, gage height, 11.40 ft.



(39) 09472000 San Pedro River near Redington, Ariz.

Location.--Lat 32°22'50", long 110°26'45", in NE¼NW¼ sec.19, T.12 S., R.19 E., Cochise County, Hydrologic Unit 15050203, on left bank 0.3 mi upstream from Cochise-Pima County line, 4.3 mi southeast of Redington, and 30 mi north of Benson. Supplementary gage, 50 ft upstream.

Drainage area.--2,939 mi², of which 696 mi² is in Mexico.

Gage-height record.--Water-stage recorder graph from principal and supplementary gages. Datum of gages is 2,930.04 ft NGVD of 1929.

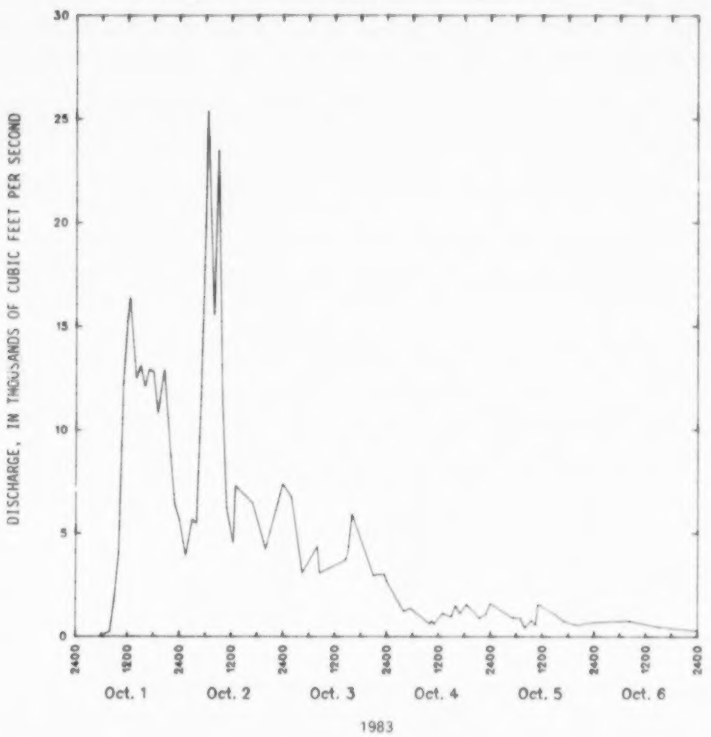
Discharge record.--Stage-discharge relation extended above 700 ft³/s based on step-backwater computations and slope-area measurement at 21.6 ft.

Maxima.--September-October 1983: Discharge, 25,400 ft³/s 0630 hours Oct. 2, gage height, 21.60 from slope-area measurement of peak flow.

1906 to August 1983: Discharge, about 90,000 ft³/s Sept. 28, 1926, gage height, 29.0 ft present site and datum from floodmark. Discharge computed on basis of peak discharges of San Pedro River at Charleston and Gila River at Kelvin.

Remarks.--Flood-warning site.

(39) 09472000 San Pedro River near Redington, Ariz.—Continued



(40) Redfield Canyon Wash at Redington, Ariz.
(Miscellaneous site)

Location.--Lat 32°25'39", long 110°28'43", in SE¼SW¼ sec.35, T.11 S., R.18 E., and NE¼NW¼ sec.2, T.12 S., R.18 E., Cochise County, Hydrologic Unit 15050203, at bridge on San Manuel-Pomerene Road, 22 mi south of San Manuel, 0.8 mi east of community of Redington, and 1 mi above mouth.

Drainage area.--61.2 mi².

Maximum.--September-October 1983: Discharge, 17,600 ft³/s Oct. 1, from contracted-opening measurement of peak flow.

(41) 09473000 Aravaipa Creek near Mammoth, Ariz.

Location.--Lat 32°50'37", long 110°37'07", in NW¼NW¼ sec.9, T.7 S., R.17 E., Pinal County, Hydrologic Unit 15050203, on right bank 6 mi upstream from mouth, and 9 mi north of Mammoth.

Drainage area.--541 mi².

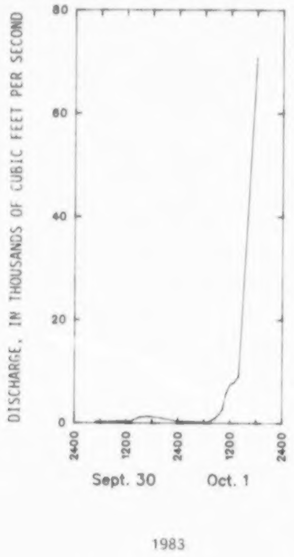
Gage-height record.--Digital water-stage recorder tape to 1400 hours Oct. 1, when gage was damaged and major channel changes occurred. Partial gage-height record reconstructed based on floodmarks past gage. Altitude of gage is 2,350 ft, from topographic map.

Discharge record.--Stage-discharge relation extended above 1,300 ft³/s on basis of step-backwater computations and slope-area measurements at 8.09 and 13.71 ft.

Maxima.--September-October 1983: Discharge, 70,800 ft³/s about 1800 hours Oct. 1, gage height, 16.76 ft from profile of outside floodmarks from slope-area measurement of peak flow.

1931 to August 1983: Discharge, 16,200 ft³/s Dec. 8, 1978, gage height, 13.71 ft from profile past gage.

Outside period of record: A discharge of 20,000 ft³/s occurred Aug. 2, 1919, at former gaging station 6 mi downstream, from rating curve extended above 5,100 ft³/s on basis of velocity-area study.



(42) 09473100 San Pedro River below Aravaipa Creek, near Mammoth, Ariz.

Location.--Lat 32°51'03", long 110°43'27", in NE¼SE¼ sec.5, T.7 S., R.16 E., Pinal County Hydrologic Unit 15050203, on left bank 1.0 mi downstream from mouth of Aravaipa Creek 10 mi north of Mammoth and 11 mi upstream from mouth.

Drainage area.--4,360 mi², of which 696 mi² is in Mexico.

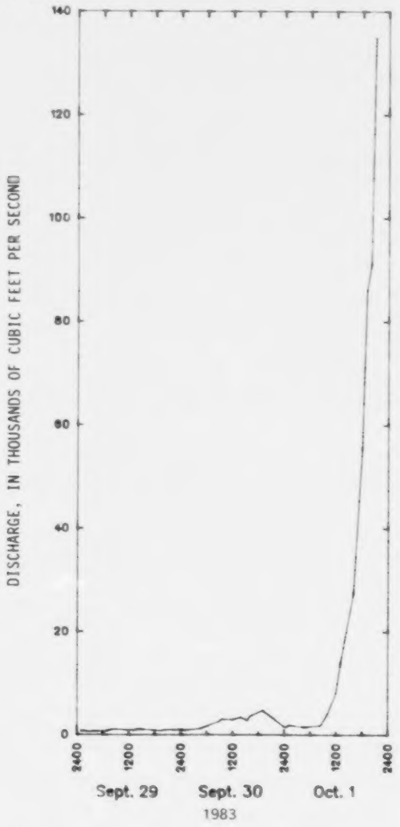
(42) 09473100 San Pedro River below Aravaipa Creek, near Mammoth, Ariz.—Continued

Gage-height record.--Digital satellite transmittals and water-stage recorder graph from manometer gage to 1200 hours Oct. 1 when major channel changes occurred. Altitude of the gage is 2,125 ft from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 58 ft^3/s and extended above on the basis of one slope-conveyance estimate at 7.83 ft and two slope-area measurements at 5.20 and 17.7 ft.

Maxima.--September-October 1983: Discharge, 135,000 ft^3/s 2100 hours Oct. 1, gage height, 17.7 ft from slope-area measurement of peak flow.
1906 to August 1983: Discharge, about 85,000 ft^3/s Sept. 28, 1926.

Remarks.--Flood-warning site.



(43) Gila River at Hayden, Ariz.
(Miscellaneous site)

Location.--Lat 32°59'05", long 110°47'12", in SE¼NW¼ sec.23, T.5 S., R.15 E., Pinal County, Hydrologic Unit 15050100, at railroad bridge near Hayden Country Club, 0.25 mi downstream from the confluence of the San Pedro River.

Drainage area.--17,757 mi^2 of which 4,871 mi^2 is below Coolidge Dam.

Maximum.--September-October 1983: Discharge, 125,000 ft^3/s Oct. 2, 1,922.88 ft from flood mark on railroad bridge.

Remarks.--Discharge was determined from a rating developed for the flood insurance study for Hayden.

(44) 09474000 Gila River at Kelvin, Ariz.

Location.--Lat 33°06'10", long 110°58'33", in NE¼NW¼ sec.12, T.4 S., R.13 E., Pinal County, Hydrologic Unit 15050100, on left bank at Kelvin, 500 ft downstream from Mineral Creek, 18 mi downstream from San Pedro River, and 19 mi upstream from Ashurst-Hayden Dam.

Drainage area.--18,011 mi^2, of which 5,125 mi^2 is below Coolidge Dam.

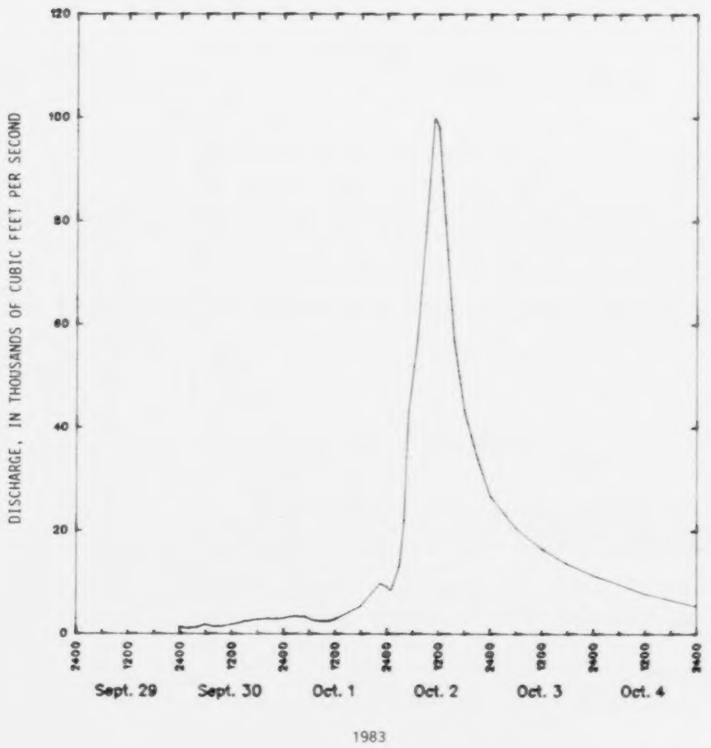
Gage-height record.--Water-stage recorder graph to 1900 hours Oct. 1 when counterweight bottomed out. Record was reconstructed based on outside high-water mark, discharge measurements, and adjoining good record. Datum of gage is 1,745.02 ft NGVD of 1929.

Discharge record.--Stage-discharge relation extended above 12,000 ft^3/s on basis of high-water mark and discharge at Hayden, 18 mi upstream.

Maxima.--September-October 1983: Discharge, 100,000 ft^3/s about 1100 hours Oct. 2, gage height, 33.0 ft from outside high-water mark.
1928 to October 1982: Discharge, 42,800 ft^3/s Aug. 8, 1930, gage height, 12.6 ft.
1911 to August 1983: Discharge, about 132,000 ft^3/s Jan. 20, 1916, gage height, 19.5 ft from rating curve extended above slope-area measurement of peak discharge of Sept. 28, 1926, at gage height 16.2 ft.

Remarks.--Flow partially regulated by San Carlos Reservoir 49 mi upstream since Nov. 15, 1928. Records of peak flow show discharge from drainage area below Coolidge Dam. Flood-warning site.

(44) 09474000 Gila River at Kelvin, Ariz.--Continued



(45) Gila River at U.S. Highway 89, near Florence, Ariz.
(Miscellaneous site)

Location.--Lat 33°03'30", long 111°22'52", in SE¼NW¼ sec.25, T.4 S., R.9 E., Pinal County, Hydrologic Unit 15050100, on U.S. Highway 89 bridge, 1.5 mi north of Florence.

Drainage area.--18,420 mi², of which 696 mi² is in Mexico and 5,534 mi is below Coolidge Dam.

Maximum.--September-October 1983: Discharge, 61,000 ft³/s Oct. 3, from contracted-opening measurement of peak flow.

(46) Gila River at State Highway 87, near Sacaton, Ariz.
(Miscellaneous site)

Location.--Lat 33°05'25", long 111°42'25", in SW¼SE¼ sec.11, T.4 S., R.6 E., Pinal County, Hydrologic Unit 15050100, in Gila River Indian Reservation, on State Highway 87, 2.3 mi northwest of road junction of State Highways 87 and 187, and 2.0 mi northeast of Sacaton.

Drainage area.--18,885 mi², of which 696 mi² is in Mexico and 5,999 mi is below Coolidge Dam.

Maximum.--September-October 1983: Discharge, 46,000 ft³/s Oct. 3, from contracted-opening and flow over the road measurement of peak flow.

(47) 09479500 Gila River near Laveen, Ariz.

Location.--Lat 33°15'25", long 112°09'59", in SW¼NW¼ sec.16, T.2 S., R.2 E., Pinal County, Hydrologic Unit 15050100, in Gila River Indian Reservation, on left abutment of highway bridge, 2.1 mi upstream from Santa Cruz River, 2.6 mi south of Komatke, and 7.3 mi south of Laveen. Supplementary water-stage recorder on overflow channel at highway bridge 0.2 mi south.

Drainage area.--20,615 mi² of which 696 mi² is in Mexico and 7,729 mi² is below Coolidge Dam.

Gage-height record.--None. Datum of both gages is 1,018.90 ft NGVD of 1929.

Maxima.--September-October 1983: Discharge, 35,000 ft³/s about 1400 hours Oct. 4 estimated on basis of routing; gage height, 12.08 ft.

1940 to August 1983: Discharge, 11,900 ft³/s Jan. 2, 1941, gage height, 10.20 ft Dec. 21, 1978.

Remarks.--Flow partly regulated by storage in San Carlos Reservoir since 1928; discharge represents runoff from area below the reservoir.

(48) 09480000 Santa Cruz River near Lochiel, Ariz.

Location.--Lat 31°21'19", long 110°35'20", in SW¼ sec.11, T.24 S., R.17 E. (unsurveyed), Santa Cruz County, Hydrologic Unit 15050301, on south border of Spanish land grant of San Rafael, near left bank on downstream side of pier of bridge on county road, 1.7 mi upstream from international boundary, and 2.5 mi northeast of Lochiel.

Drainage area.--82.2 mi².

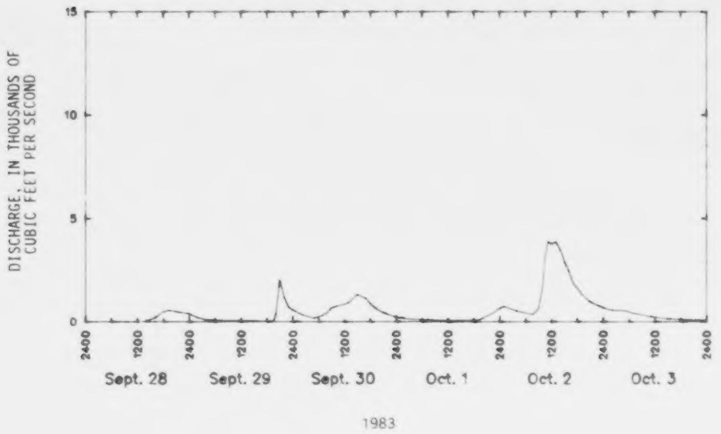
Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 4,620 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,600 ft³/s and extended above on basis of slope-area measurements of peak flows at gage heights of 8.90 and 10.21 ft.

Maxima.--September-October 1983: Discharge, 3,880 ft³/s 1115 and 1300 hours Oct. 2, gage height, 8.22 ft.

1949 to August 1983: Discharge, 12,000 ft³/s Oct. 9, 1977, gage height, 10.21 ft.

(48) 09480000 Santa Cruz River near Lochiel, Ariz.—Continued



(49) 09480500 Santa Cruz River near Nogales, Ariz.

Location.--Lat 31°20'40", long 110°51'03", in NW¼ sec.18, T.24 S., R.15 E. (unsurveyed), Santa Cruz County, Hydrologic Unit 15050301, in Spanish land grant of Maria Santisima del Carmen, on left bank 0.8 mi downstream from international boundary, and 5.5 mi east of Nogales.

Drainage area.--533 mi², of which 348 mi² is in Mexico.

Gage-height record.--Water-stage recorder graph. Datum of gage is 3,702.54 ft NGVD of 1929 (levels by International Boundary and Water Commission).

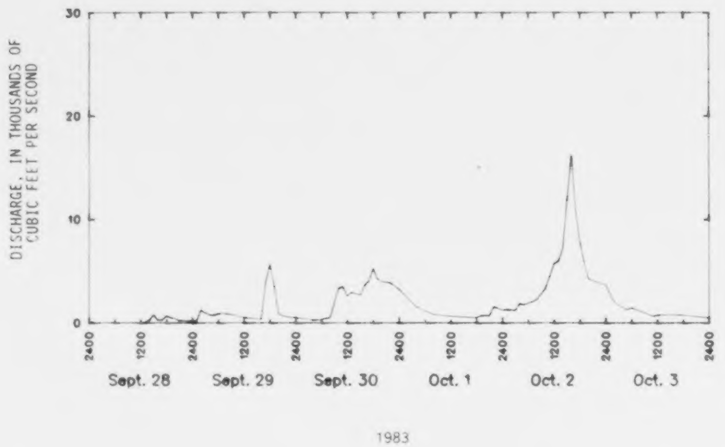
Discharge record.--Stage-discharge relation poorly defined by current-meter measurements below 17,000 ft³/s.

Maxima.--September-October 1983: Discharge, 16,200 ft³/s 1600 hours Oct. 2, gage height, 12.40 ft.

1892 to August 1983: Discharge, 31,000 ft³/s Oct. 9, 1977, from slope-area measurement of peak flow. Gage height, 15.5 ft.

Remarks.--Flood warning site.

(49) 09480500 Santa Cruz River near Nogales, Ariz.—Continued



(50) Ephraim Canyon Wash near Nogales, Ariz.
(Miscellaneous site)

Location.--Lat 31°20'22", long 110°57'14", in NE¼SW¼ sec.18, T.24 S., R.14 E. Santa Cruz County, Hydrologic Unit 15050301, at upstream end of culvert on I-19 about 2,300 ft upstream of corporate limits of City of Nogales.

Drainage area.--6.55 mi² from U.S. Soil Conservation Service.

Maxima.--September-October 1983: Discharge, 1,480 ft³/s Oct. 1, from flow through culvert estimate of peak flow.

1980 to August 1983: Discharge, 2,160 ft³/s Aug. 13, 1980 from culvert computation of peak flow.

(51) Potrero Creek at mouth near Nogales, Ariz.
(Miscellaneous site)

Location.--Lat 31°26'40", long 110°57'40", in NE¼ sec.12, T.23 S., R.13 E., Santa Cruz County, Hydrologic Unit 15050301, at the international sewage treatment plant, 0.25 mi upstream from mouth, and 5.6 mi north-northwest of Nogales.

Drainage area.--91.4 mi².

Maxima.--September-October 1983: Discharge, 5,500 ft³/s Oct. 1, from slope-area estimate of peak flow.

1977 to August 1983: Discharge 9,300 ft³/s Oct. 9, 1977, from slope-area measurement of peak flow.

(52) 09481500 Sonoita Creek near Patagonia, Ariz.
(Discontinued gaging station)

Location.--Lat 31°30'00", long 110°49'00", in SE¼SW¼ sec.21, T.22 S., R.15 E., Santa Cruz County, Hydrologic Unit 15050301, on left abutment of former railroad bridge, 5 mi downstream from Patagonia.

Drainage area.--209 mi^2.

Gage-height record.--None. Datum of gage is 3,818.09 ft NGVD of 1929, supplementary adjustment of 1959.

Discharge record.--Stage discharge relation extended above 4,500 ft^3/s on basis of slope-area measurement at gage height 13.01 ft.

Maxima.--September-October 1983: Discharge, 16,000 ft^3/s Oct. 1, gage height, 13.7 ft from high-water mark in well.

1930 to August 1983: Discharge, 14,000 ft^3/s Sept. 30, 1946, gage height, 13.0 ft, from rating curve extended above 1,500 ft^3/s on basis of slope-area measurement of peak flow.

(53) Agua Fria Canyon near Rio Rico, Ariz.
(Miscellaneous site)

Location.--Lat 31°28'40", long 111°00'02", in SW¼SE¼ sec.27, T.22 S., R.13 E., Santa Cruz County, Hydrologic Unit 15050301, at Interstate Highway 19, 0.4 mi upstream from mouth, 1 mi northwest of Rio Rico, and 12 mi north of Nogales.

Drainage area.--40.2 mi^2.

Maxima.--September-October 1983: Discharge, 4,820 ft^3/s 0815 hours Oct. 1, from contracted-opening measurement of peak flow.

About 1900 to August 1983: Discharge 10,200 ft^3/s Oct. 9, 1977, from contracted-opening measurement of peak flow.

(54) Peck Canyon near Rio Rico, Ariz.
(Miscellaneous site)

Location.--Lat 31°30'40", long 111°00'46", in SE¼ sec.16, T.22 S., R.13 E., Santa Cruz County, Hydrologic Unit 15050301, at Interstate Highway 19, at mouth 3.5 mi northwest of Rio Rico and 14 mi north of Nogales.

Drainage area.--47.8 mi^2.

Maxima.--September-October 1983: Discharge, 12,100 ft^3/s Oct. 1, from contracted-opening measurement of peak flow.

About 1900 to August 1983: Discharge, 7,000 ft^3/s Dec. 19, 1967, from contracted-opening measurement of peak flow.

(55) 09482000 Santa Cruz River at Continental, Ariz.

Location.--Lat 31°52'17", long 110°58'46", in SE¼SE¼ sec.11, T.18 S., R.13 E. (unsurveyed), Pima County, Hydrologic Unit 15050301, in Spanish land grant of San Ignacio de la Canoa, on right bank 0.8 mi northeast of Green Valley Post Office and 1.5 mi north of Continental.

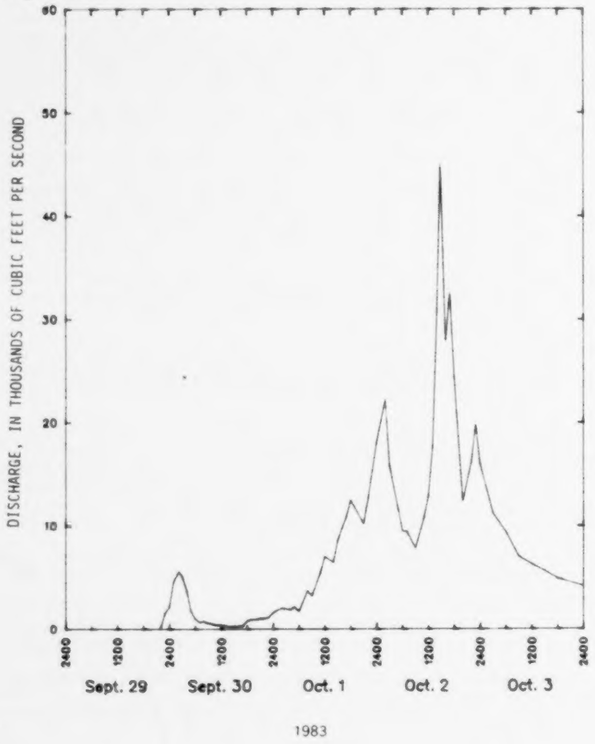
Drainage area.--1,682 mi^2, of which 395 mi^2 is in Mexico.

Gage-height record.--Digital water-stage recorder tape from manometer gage. Datum of gage is 2,819.07 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined below 550 ft^3/s by current-meter measurements and extended above on basis of step-backwater analysis and slope-area measurement of peak flow.

Maxima.--September-October 1983: Discharge, 45,000 ft^3/s, about 1445 hours Oct. 2, gage height, 16.34 ft from slope-area measurement of peak flow.

1892 to August 1983: Discharge, 26,500 ft^3/s Oct. 10, 1977, gage height, 16.70 ft, site and datum then in use from rating curve extended above 16,000 ft^3/s on basis of flood-routing studies.



(56) 09482200 Flato Wash near Sahuarita, Ariz.
(Discontinued crest-stage station)

Location.--Lat 32°02'43", long 110°57'00", in SW¼SE¼ sec.7, T.16 S., R.14 E. Pima County, Hydrologic Unit 15050301, at U.S. Highway 89 (Nogales Highway), 0.2 mi upstream from north, 6 mi north of Sahuarita.

Drainage area.--30.1 mi^2 of which 6.65 mi^2 is contributing.

Maxima.--September-October 1983: Discharge, 820 ft^3/s, Oct. 1, gage height, 5.37 ft.
1928 to August 1983: Discharge, 4,500 ft^3/s, 1955, gage height, 11.00 ft.

(57) 09482485 Cholla Wash at Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°12'00", long 110°59'45", in SE¼SE¼NE¼-sec.22, T.14 S., R.13 E. Pima County, Hydrologic Unit 15050301, 30 ft upstream from culvert on Mission Road., at the northwest corner of the intersection of MIssion Road and Silverlake Road.

Drainage area.--1.27 mi^2.

Gage-height record.--Digital water-stage recorder tape. Datum of gage is 2,376.00 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter and slope-area measurements.

Maxima.--September-October 1983: Discharge, 764 ft^3/s, 0730 hours Oct. 1, gage height, 1.74 ft from inside high-water mark.
1982 to August 1983: Discharge, 1,470 ft^3/s Aug. 23, 1982, gage height, 3.45 ft.

(58) 09482500 Santa Cruz River at Tucson, Ariz.
(Discontinued gaging station)

Location.--Lat 32°13'16", long 110°58'52", in NE¼NE¼ sec.14, T.14 S., R.13 E., Pima County, Hydrologic Unit 15050301, on downstream side of center pier of Congress Street Bridge in Tucson.

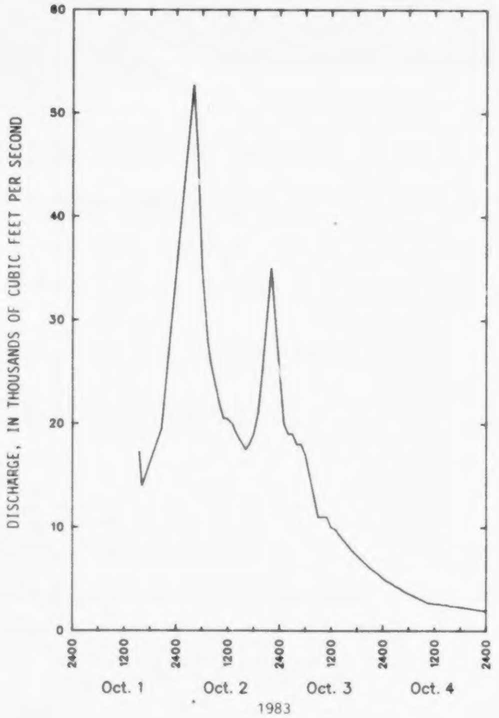
Drainage area.--2,222 mi^2, of which 395 mi^2 is in Mexico.

Gage-height record.--Wire-weight recorder readings. Datum of gage is 2,317.82 ft NGVD of 1929.

Discharge record.--Stage-discharge relation for period of gage height record defined by current-meter float area and slope-area measurements. Discharge estimated by flood routing for periods of no gage-height record.

Maxima.--September-October 1983: Discharge, 52,700 ft^3/s about 0400 hours Oct. 2, gage height, 22.2 ft from floodmark under the bridge.
1892 to August 1983: Discharge, 23,700 ft^3/s Oct. 10, 1977, from slope-area measurement of peak flow, gage height, 21.8 ft from floodmark on the bank.

(58) 09482500 Santa Cruz River at Tucson, Ariz.—Continued



(59) 09483042 Cemetery Wash at Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°15'50", long 110°58'42", in NE¼NE¼ sec.35, T.13 S., R.13 E., Pima County, Hydrologic Unit 15050302, 270 ft west of U.S. Highway 89, 300 ft south of projection of Ft. Lowell Road in Tucson.

Drainage area.--1.17 mi^2.

Gage-height record.--Crest stage and digital water-stage recorder tape. Altitude of gage is 2,325 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by computation of flow through culvert, current-meter, and slope-area measurements.

Maxima.--September-October 1983: Discharge, 456 ft^3/s 0330 hours Oct. 2, gage height, 4.26 ft.
1966 to August 1983: Discharge, 600 ft^3/s Aug. 20, 1968, gage height, 4.95 ft.

(60) 09483045 Flowing Wells Wash at Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°15'55", long 110°59'40", in SW¼SW¼ sec.26, T.13 S., R.13 E., Pima County, Hydrologic Unit 15050302, at intersection of Ft. Lowell Road and Flowing Wells Road in Tucson city limits.

Drainage area.--3.53 mi^2.

Gage-height record.--Crest stage and digital water-stage recorder tape. Altitude of gage is 2,310 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by computation of flow through culvert, current-meter, and slope-area measurements.

Maxima.--September-October 1983: Discharge, 984 ft^3/s 0330 hours Oct. 2, gage height, 6.74 ft.

1971 to August 1983: Discharge, 1,470 ft^3/s Aug. 23, 1982, gage height, 8.30 ft.

(61) 09483100 Tanque Verde Creek near Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°14'48", long 110°40'46", in NE¼NW¼ sec.2, T.14 S., R.16 E., Pima County, Hydrologic Unit 15050302, 4.4 mi east of Tanque Verde School, 7.4 mi upstream from Agua Caliente Wash, and 17.5 mi east of Tucson city hall.

Drainage area.--43.0 mi^2.

Gage-height record.--Crest stage only. Altitude of gage is 2,720 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 2,000 ft^3/s on basis of slope-area measurements at 4.86, 6.03, and 6.7 ft.

Maxima.--September-October 1983: Discharge, 8,600 ft^3/s 0445 hours Oct. 2, gage height, 7.39 ft.

1960 to August 1983: Discharge, 6,700 ft^3/s July 30, 1981, gage height, 6.7 ft.

Remarks.--Flood-warning site.

(62) 09483250 Rob Wash at Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°14'08", long 110°48'58", in NE¼NW¼ sec.9, T.14 S., R.15 E., Pima County, Hydrologic Unit 15050302, at Speedway Boulevard, 0.4 mi east of Pantano Road, and 1 mi north of East Broadway in Tucson city limits.

Drainage area.--2.08 mi^2.

Gage-height record.--Digital water-stage recorder tape. Datum of gage is 2,572.73 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements, weir computations, and step-backwater studies.

Maxima.--September-October 1983: Discharge, 396 ft^3/s 0330 hours Oct. 2, gage height, 2.49 ft.

1971 to August 1983: Discharge, 1,900 ft^3/s Aug. 23, 1982, gage height, 4.83 ft.

(63) 09484000 Sabino Creek near Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°19'00", long 110°48'35", in SE¼NE¼ sec.9, T.13 S., R.15 E., Pima County, Hydrologic Unit 15050302, 1,000 ft upstream from Lower Sabino Dam, 0.5 mi north of Coronado National Forest boundary, and 12 mi northeast of Tucson city hall.

Drainage area.--35.5 mi^2.

Gage-height record.--Crest stage only. Altitude of gage is 2,720 ft from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter and indirect measurements.

Maxima.--September-October 1983: Discharge, 6,300 ft^3/s 1300 hours Oct. 1, gage height, 5.6 ft.

1932 to August 1983: Discharge, 7,730 ft^3/s Sept. 6, 1970, gage height, 10.21 ft from rating extended above 3,000 ft^3/s on basis of slope-area measurement at gage height 9.65 ft.

Remarks.--Flood-warning site.

(64) 09484530 Craycroft Wash Tributary near Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°18'05", long 110°52'13", in NW¼ sec.13, T.13 S., R.14 E., Pima County, Hydrologic Unit 15050302, at Paseo Arenal, 0.4 mi south of Sunrise Drive and 0.25 mi east of Craycroft Road.

Drainage area.--0.038 mi^2.

Gage-height record.--Crest stage and digital water-stage recorder tape. Altitude of gage is 2,715 ft, from topographic map.

Discharge record.--Stage-discharge relation based on weir computations and current-meter measurements.

Maxima.--September-October 1983: Discharge, 28.0 ft^3/s 0315 hours Oct. 2, gage height, 1.52 ft.

1982 to August 1983: Discharge, 9.5 ft^3/s Sept. 11, 1982, gage height, 1.04 ft.

(65) 09484533 Craycroft Wash near Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°17'24", long 110°52'23", in SW¼NW¼ sec.24, T.13 S., R.14 E., Pima County, Hydrologic Unit 15050302, at Center Village Drive. 0.2 mi east of Craycroft Road and 2.2 mi north of Tucson city limits.

Drainage area.--2.37 mi^2.

Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 2,620 ft, from topographic map.

Discharge record.--Stage-discharge relation based on critical depth computations and culvert rating.

Maxima.--September-October 1983: Discharge, 557 ft^3/s 0330 hours Oct. 2, gage height, 3.67 ft.

1982 to August 1983: Discharge, 580 ft^3/s Sept. 11, 1982, gage height, 3.74 ft.

(66) 09484600 Pantano Wash near Vail, Ariz.
(Partial-record station)

Location.--Lat 32°02'09", long 110°40'37", in SW¼SE¼ sec.14, T.16 S., R.16 E., Pima County, Hydrologic Unit 15050302, 60 ft upstream from dam, 2.2 mi southeast of vail, and 20 mi southeast of Tucson city hall.

Drainage area.--457 mi^2.

Gage-height record.--Crest stage only. Altitude of gage is 3,205 ft, from topographic map.

Discharge record.--Stage-discharge relation based on flow over dam computations to 10,000 ft^3/s.

Maxima.--September-October 1983: Discharge, 12,000 ft^3/s Oct. 1 or 2, gage height, 15.25 ft from inside high-water mark.
1930 to August 1983: Discharge, 38,000 ft^3/s Aug. 11, 1958, gage height, 24.0 ft.

Remarks.--Flooo-warning site.

(67) 09485000 Rincon Creek near Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°07'46", long 110°37'32", in NW¼NE¼ sec.17, T.15 S., R.17 E., Pima County, Hydrologic Unit 15050302, 9 mi upstream from mouth, and 22 mi southeast of Tucson City Hall.

Drainage area.--44.8 mi^2.

Gage-height record.--Crest stage only. Altitude of gage is 3,120 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 1,800 ft^3/s and extended above on basis of slope-area measurements.

Maxima.--September-October 1983: Discharge, 5,640 ft^3/s 0500 hours Oct. 2, gage height, 8.80 ft from inside high-water mark.
1952 to August 1983: Discharge, 9,660 ft^3/s Aug. 19, 1971, gage height, 10.50 ft.

Remarks.--Flood-warning site.

(68) 09485450 Pantano Wash (at Broadway Blvd.) at Tucson, Ariz.
(Discontinued gaging station)

Location.--Lat 32°13'14", long 110°49'44", in NW¼NE¼ sec.17, T.14 S., R.15 E., Pima County, Hydrologic Unit 15050302, near right bank at bridge on Broadway Blvd., 4.6 mi upstream from mouth, and 8.5 mi east of Tucson city hall.

Drainage area.--599 mi^2.

Discharge record.--Stage-discharge relation defined by current-meter, and slope-area measurements and flow over dam computation below 1,500 ft^3/s and extended above on the basis of critical depth computation at the drop structure.

Maxima.--September-October 1983: Discharge, 11,000 ft^3/s Oct. 2, gage height, 8.60 ft, from high-water mark in well.
Probably 1930 to August 1983: Discharge, 20,000 ft^3/s (566 m^3/s) Aug. 12, 1958, from slope-area measurement of peak flow at site 1 mi (1.6 km) downstream at Speedway Blvd.

(69) 09485570 Alamo Wash at Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°15'34", long 110°53'02", in SE¼SE¼NW¼ sec.35, T.13 S., R.14 E., Pima County, Hydrologic Unit 15050302, 600 ft downstream from Glenn Street, 0.5 mi east of the intersection of Glenn Street and Swan Road.

Drainage area.--9.56 mi^2.

Gage-height record.--Crest-stage and digital water-stage recorder tape. Datum of gage is 2,427.3 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements step-backwater studies, and float-area measurements.

Maxima.--September-October 1983: Discharge, 1,680 ft^3/s 0815 hours Oct. 1, gage height, 4.61 ft.
1976 to August 1983: Discharge, 3,310 ft^3/s Aug. 23, 1982, gage height, 6.56 ft.

(70) 09485900 Pima Wash near Tucson, Ariz.
(Discontinued crest-stage station)

Location.--Lat 32°20'15", long 110°57'35", in SW¼SW¼ sec.31, T.12 S., R.14 E., Pima County, Hydrologic Unit 15050302, at Ina Road, 4 mi north of Tucson city limits.

Drainage area.--4.93 mi^2.

Gage-height record.--None. Altitude of gage is 2,650 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by computations of flow through culvert.

Maxima.--September-October 1983: Discharge, 460 ft^3/s Oct. 1, gage height, 17.2 ft from floodmarks.
1964 to August 1983: Discharge, 195 ft^3/s Sept. 6, 1964, gage height, 11.12 ft.

(71) 09486000 Rillito Creek near Tucson, Ariz.
(Discontinued gaging station)

Location.--Lat 32°17'41", long 110°59'00", in SW¼SE¼ sec.14, T.13 S., R.13 E., Pima County, Hydrologic Unit 15050302, on right bank 600 ft downstream from Pima Wash, 1,800 ft downstream from U.S. Highway 89, 5 mi above mouth, and 5.4 mi north of Tucson city hall.

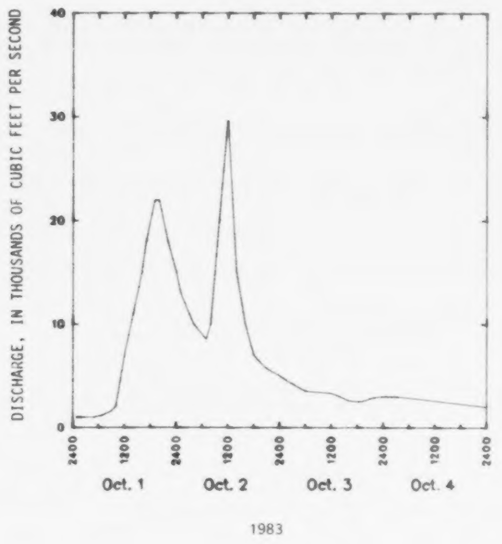
Drainage area.--918 mi^2.

Gage-height record.--None. Datum of gage is 2,280.16 ft NGVD of 1929, supplementary adjustment of 1954.

Discharge record.--Stage-dischrge relation defined by current-meter measurements, slope-area, flow routing from upstream stations and field observations.

Maxima.--September-October 1983: Discharge, 29,700 ft^3/s about 1200 hours Oct. 2, from slope-area measurement of peak flow at site 0.6 mi downstream at La Canada Drive.
1915 to August 1983: Discharge, 24,000 ft^3/s Sept. 23, 1929, gage height, 24.0 ft from floodmarks at site 800 ft upstream at different datum from rating extended above 12,000 ft^3/s on basis of velocity-area studies.

(71) 09486000 Rillito Creek near Tucson, Ariz.—Continued



(72) 09486050 Roller Coaster Wash near Tucson, Ariz.
(Partial-record station)

Location.--Lat 32°18'09", long 111°00'12", in SE¼SE¼NW¼ sec.15, T.13 S., R.13 E., Pima County, Hydrologic Unit 15050302, at Oracle-Jaynes Road, 0.3 mi upstream from the mouth and 1.4 mi north of Tucson city limits.

Drainage area.--1.75 mi^2.

Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 2,265 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter, float-area, and slope-area measurements.

Maxima.--September-October 1983: Discharge, 291 ft^3/s 0730 hours Oct. 1, gage height, 3.69 ft.

1982 to August 1983: Discharge, 960 ft^3/s Aug. 9, 1983, gage height, 5.90 ft.

(73) 09486300 Canada del Oro near Tucson, Ariz.
(Discontinued gaging station)

Location.--Lat 32°22'27", long 111°00'31", in SW¼NW¼ sec.22, T.12 S., R.13 E., Pima County, Hydrologic Unit 15050301, on right bank at upstream side of Overton Road, 4.7 mi upstream from mouth, and 10.5 mi north of Tucson city hall.

Drainage area.--250 mi^2.

Gage-height record.--None. Datum of gage is 2,374.39 ft NGVD of 1929 from project bench mark.

Discharge record.--Stage-discharge relation extended above 600 ft^3/s on basis of slope-area measurements at gage heights 4.5 and 7.5 ft.

Maxima.--September-October 1983: Discharge, 6,600 ft^3/s Oct. 1 or 2, gage height, 5.94 ft from outside high-water mark.

About 1950 to August 1983: Discharge, 17,000 ft^3/s July 21, 1959, from slope-area measurement at Tangerine Road, 4 mi upstream.

(74) 09486500 Santa Cruz River at Cortaro, Ariz.

Location.--Lat 32°21'04", long 111°05'38", in NW¼NW¼ sec.35, T.12 S., R.12 E., Pima County, Hydrologic Unit 15050302, on downstream side of right bridge pier 0.5 mi southwest of Cortaro, 2.6 mi downstream from Canada del Oro and 3.7 mi downstream from Rillito Creek.

Drainage area.--3,503 mi^2 of which 395 mi^2 is in Mexico.

Gage-height record.--Water-stage recorder graph and tape prior to 1500 hours, Oct. 1 when channel changes began. Graphic recorder operated until about 0800 hours on Oct. 2 when bridge washed out. Datum of gage is 2,133.13 ft NGVD of 1929 (State Highway Department bench mark).

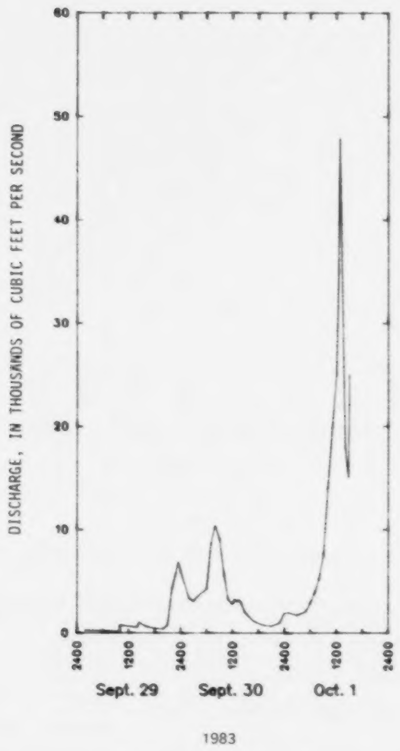
Discharge record.--Stage-discharge relation for period of gage-height record defined by current-meter measurements. Discharge was not reconstructed for the duration of the flood.

Maxima.--September-October 1983: Discharge, 65,000 ft^3/s about 0600 hours, Oct. 2, estimated on basis of flood-routing studies; gage height, 16.57 ft from outside high-water mark.

1935 to August 1983: Discharge, 23,000 ft^3/s Oct. 10, 1977, gage height, 15.6 ft.

Remarks.--Flow of less than about 75 ft^3/s is waste water from sewage-disposal plant.

(74) 09486500 Santa Cruz River at Cortaro, Ariz.—Continued



(75) 09487000 Brawley Wash near Three Points, Ariz.
(Discontinued crest-stage station)

Location.--Lat 32°04'39", long 111°20'08", in NW¼SW¼ sec.33, T.15 S., R.10 E., Pima County, Hydrologic Unit 15050304, 0.25 mi downstream from State Highway 86, 1.6 mi west of Three Points (Robles Junction), and 23 mi west of Tucson.

Drainage area.--776 mi².

(75) 09487000 Brawley Wash near Three Points, Ariz.—Continued

Gage-height record.--None. Datum of gage is 2,532.85 ft NGVD of 1929 (levels by U.S. Coast and Geodetic Survey).

Maxima.--September-October 1983: Discharge, 19,100 ft³/s probably Oct. 1 or 2, from contracted-opening measurement of peak flow; gage height, 12.07 ft from floodmarks opposite the washed-out crest-stage gage.

1955 to August 1983: Discharge, 13,200 ft³/s Sept. 4, 1970, gage height, 15.8 ft, from high-water profile, at former highway bridge.

(76) 09487250 Los Robles Wash near Marana, Ariz.
(Discontinued crest-stage station)

Location.--Lat 32°26'16", long 111°18'13", in SE¼SE¼ sec.27, T.11 S., R.10 E., Pima County, Hydrologic Unit 15050304, at Trico Road 0.75 mi downstream from confluence of Brawley Wash and China Draw, 3 mi upstream from Blanco Wash, and 5 mi southwest of Marana.

Drainage area.--1,170 mi².

Gage-height record.--None. Datum of gage is 1,907.76 ft NGVD of 1929 (levels by U.S. Coast and Geodetic Survey).

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September-October 1983: Discharge, 12,500 ft³/s Oct. 2 or 3, gage height, 11.7 ft.

1885 to August 1983: Discharge, 32,000 ft³/s Sept. 26, 1962, estimated from slope-area measurements at sites upstream and downstream from station.

(77) 0948850 Santa Rosa Wash near Vaiva Vo, near Sells, Ariz.
(Discontinued gaging station)

Location.--Lat 32°40'03", long 111°55'39", in SW¼SW¼ sec.2, T.9 S., R.4 E., Pinal County, Hydrologic Unit 15050306, in Papago Indian Reservation, on right bank about 1 mi downstream from Tat Momolikot Dam, 3.3 mi south of Vaiva Vo, 10 mi southwest of Chuichu, 12 mi downstream from Gu Komelik and 52 mi north of Sells. Beginning July 1974 floodflows are regulated by Lake St. Clair, formed by Tat Momolikot Dam—total capacity 384,000 acre-ft.

Maxima.--September-October 1983: Discharge, 1,890 ft³/s Oct. 4 computed on basis of inflow to Lake St. Clair which is equivalent to unregulated flow at Santa Rosa Wash.

1955 to August 1983: Discharge, 53,100 ft³/s Sept. 27, 1962, gage height, 16.9 ft from rating curve extended above 840 ft³/s on basis of slope-area measurement of peak flow.

Remarks.--Maximum water-surface elevation of the reservoir was 1,499.09 ft at 1400 hours Oct. 5.

Increase in storage from 0600 hours Sept. 30 to 1400 hours Oct. 5 was 5,130 acre-ft. Data provided by the U.S. Corps of Engineers.

(78) 09489000 Santa Cruz River near Laveen, Ariz.

Location.--Lat 33°13'56", long 112°10'08", in NE¼NE¼ sec.29, T.2 S., R.2 E., Pinal County, Hydrologic Unit 15050303, in Gila River Indian Reservation, on downstream side of highway bridge, 3.4 mi upstream from mouth, 4.3 mi south of Komatke, and 9 mi south of Laveen.

Drainage area.--8,581 mi^2.

Gage-height record.--None. Datum of gage is 1,020.86 ft NGVD of 1929.

Maxima.--September-October 1983: Discharge, 33,000 ft^3/s 1100 hours Oct. 4, gage height, 19.74 ft from high-water mark in well, estimated on basis of routing flow from Santa Cruz River at Cortaro combined with the Gila River to Gillespie Dam.

1940 to August 1983: Discharge, 9,200 ft^3/s Sept. 29, 1962, gage height, 17.50 ft.

(79) 09489100 Black River near Maverick, Ariz.
(Discontinued gaging station)

Location.--Lat 33°42'27", long 109°26'48", in SW¼ sec.30, T.4 N., R.28 E., Apache County, Hydrologic Unit 15060101, in Apache National Forest, on right bank 1.0 mi downstream from Fish Creek, 1.1 mi upstream from Conklin Creek, and 6 mi southeast of Maverick.

Drainage area.--315 mi^2.

Gage-height record.--None. Altitude of gage is 6,850 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 2,100 ft^3/s and a slope-area measurement at gage height, 8.99 ft; extended above by logarithmic plotting.

Maxima.--September-October 1983: Discharge, 14,000 ft^3/s Oct. 1, gage height, 9.78 ft.

1963 to August 1983: Discharge, 11,100 ft^3/s Oct. 20, 1972, gage height, 8.99 ft present datum.

(80) 09489500 Black River below pumping plant, near Point of Pines, Ariz.

Location.--Lat 33°28'36", long 109°45'48", in W½ sec.32, T.2 N., R.25 E. (unsurveyed), Graham County, Hydrologic Unit 15060101, in San Carlos Indian Reservation on left bank 0.9 mi downstream from Phelps Dodge Corp. pumping plant, 1.3 mi downstream from Freezeout Creek, 8 mi northwest of Point of Pines.

Drainage area.--560 mi^2.

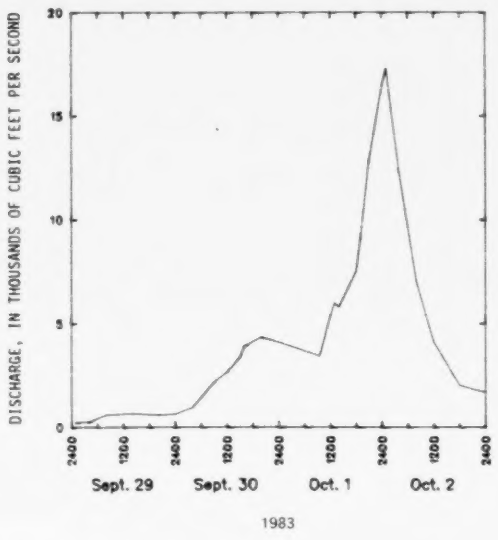
Gage-height record.--Digital water-stage recorder tape and graph to 1900 hours Oct. 1 when well was pushed over. Record was reconstructed based on high-water mark and adjoining good record. Altitude of gage is 5,725 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 4,000 ft^3/s and a slope-area measurement at 9.5 ft; extended above by logarithmic plotting.

Maxima.--September-October 1983: Discharge, 17,300 ft^3/s about 0100 hours Oct. 2, gage height, 17.3 ft.

1954 to August 1983: Discharge, 17,900 ft^3/s Oct. 19, 1972, gage height, 18.0 ft, from floodmarks.

(80) 09489500 Black River below pumping plant, near Point of Pines, Ariz.—Continued



(81) 09490500 Black River near Fort Apache, Ariz.

Location.--Lat 33°42'46", long 110°12'40", in NW¼ sec.12, T.4 N., R.20 E. (unsurveyed), Gila County, Hydrologic Unit 15060101, on downstream side of bridge, 5 mi upstream from confluence with White River, and 14 mi west of Fort Apache.

Drainage area.--1,232 mi^2.

Gage-height record.--Water-stage recorder graph. Altitude of gage is 4,345 ft, from river-profile map.

Discharge record.--Stage-discharge relation extended above 8,900 ft^3/s on basis of slope-area measurements at gage heights 14.70, 22.33, and 24.76 ft (recorded) 26.9 ft from outside high-water marks.

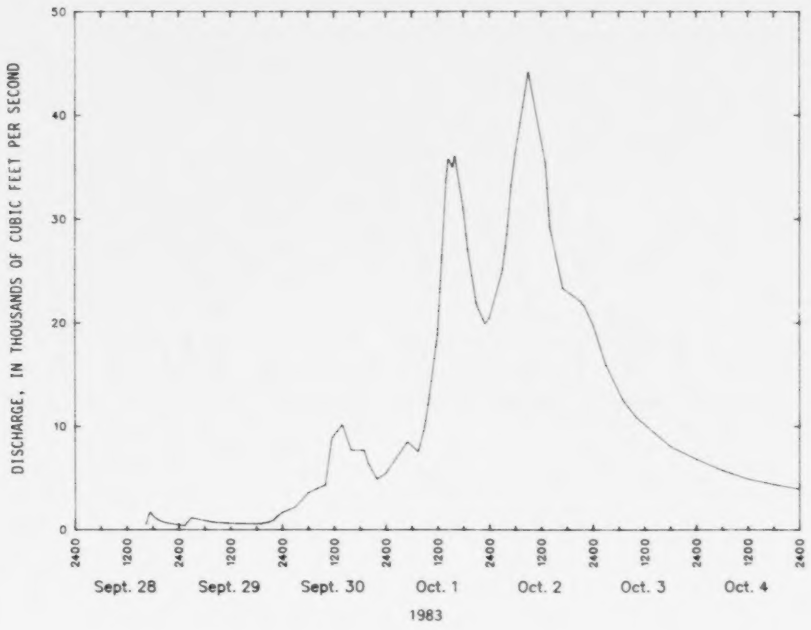
Maxima.--September-October 1983: Discharge, 44,200 ft^3/s 0900 hours, Oct. 2, gage height 24.80 ft.

1957 to October 1978: Discharge, 40,200 ft^3/s Dec. 18, 1978, gage height, 24.05 ft.

1912 to August 1983: Discharge, probably in excess of 50,000 ft^3/s Jan. 19, 1916, from correlation with Salt River near Chrysotile.

Remarks.--Flood-warning site.

(81) 09490500 Black River near Fort Apache, Ariz.



(82) 09491000 North Fork White River near McNary, Ariz.

Location.--Lat 34°02'47", long 109°44'02", in E½ sec.31, T.8 N., R.25 E. (unsurveyed), Apache County, Hydrologic Unit 15060102, in Fort Apache Indian Reservation, on left bank 1.9 mi downstream from Paradise Creek and 7 mi southeast of McNary.

Drainage area.--66 mi^2 approximately.

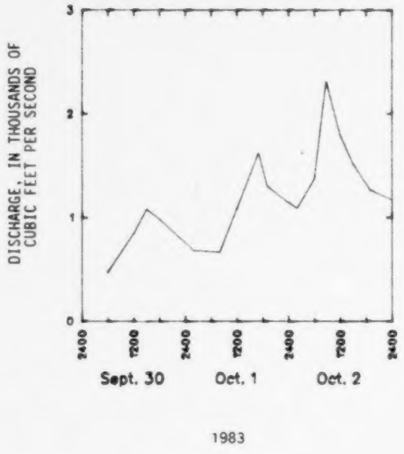
Gage-height record.--Digital water-stage recorder tape to 0200 hours Oct. 3. Datum of gage is 7,723 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 470 ft^3/s, and extended above on basis of slope-area measurement at gage height 6.78 ft.

Maxima.--September-October 1983: Discharge, 2,310 ft^3/s 0845 hours Oct. 2, gage height, 6.78 ft.

1946 to August 1983: Discharge, 1,290 ft^3/s Sept. 19, 1946, gage height, 5.36 ft, from rating curve extended above 350 ft^3/s.

(82) 09491000 North Fork White River near McNary, Ariz.—Continued



(83) 09492400 East Fork White River near Fort Apache, Ariz.

Location.--Lat 33°49'20", long 109°48'50", in SE¼ sec.16, T.5 N., R.24 E. (unsurveyed), Apache County, Hydrologic Unit 15060102, in Fort Apache Indian Reservation, on left bank 600 ft downstream from highway bridge, 0.1 mi upstream from Rock Creek, and 10 mi east of Fort Apache.

Drainage area.--38.8 mi^2.

Gage-height record.--Water-stage recorder chart except 0200 hours Oct. 1 to 1700 hours Oct. 1, when gage-height graph was reconstructed based on high-water mark and adjoining good record. Altitude of gage is 6,050 ft, by barometer.

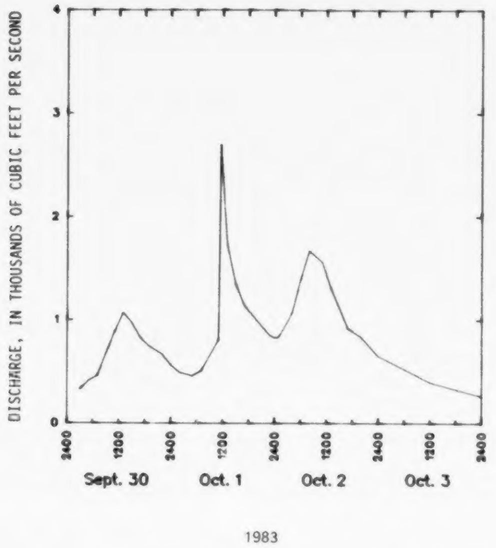
Discharge record.--Stage-discharge relation extended above 290 ft^3/s.

Maxima.--September-October 1983: Discharge, 2,700 ft^3/s about 1130 hours Oct. 1, gage height, 5.40 ft from outside high-water mark.

1958 to August 1983: Discharge, 758 ft^3/s, revised, Aug. 3, 1967, gage height, 3.63 ft, revised, in well and about 5.0 ft outside.

Remarks.--Flood-warning site.

(83) 09492400 East Fork White River near Fort Apache, Ariz.—Continued



(84) 09494000 White River near Fort Apache, Ariz.

Location.--Lat 33°44'11", long 110°09'58", in SE¼ sec.32, T.4½ N., R.21 E. (unsurveyed), Gila County, Hydrologic Unit 15060102, in Fort Apache Indian Reservation, on right bank 2,200 ft downstream from bridge, 4.5 mi upstream from confluence with Black River, and 11 mi west of Fort Apache.

Drainage area.--632 mi^2.

Gage-height record.--Water-stage recorder graph. Datum of gage is 4,365.99 ft NGVD of 1929.

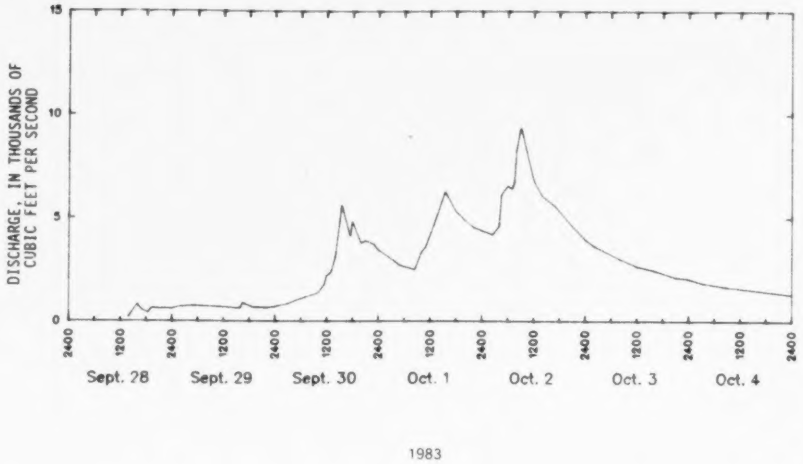
Discharge record.--Stage-discharge relation extended above 4,100 ft^3/s on basis of slope-area measurements at gage heights 9.8 and 15.71 ft.

Maxima. -September-October 1983: Discharge, 9,410 ft^3/s 0900 hours Oct. 2, gage height, 12.56 ft from high-water mark in well.

1958 to August 1983: Discharge, 14,600 ft^3/s Dec. 18, 1978, from floodmark, gage height, 15.71 ft.

Remarks.--Flood-warning site.

(84) 09494000 White River near Fort Apache, Ariz.—Continued



(85) 09497500 Salt River near Chrysotile, Ariz.

Location.--Lat 33°47'53", long 110°29'57", in sec.25, T.5 N., R.17 E. (unsurveyed), Gila County, Hydrologic Unit 15060103, in San Carlos Indian Reservation, on left bank 1,200 ft upstream from U.S. Highway 60, 5.7 mi northeast of Chrysotile, 8 mi upstream from Cibecue Creek, and 33 mi downstream from confluence of Black and White Rivers.

Drainage area.--2,849 mi^2.

Gage-height record.--Digital water-stage recorder tape. Datum of gage is 3,354.57 ft NGVD of of 1929.

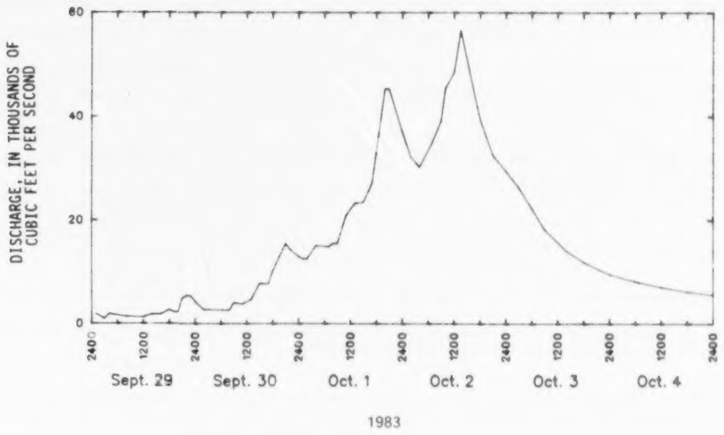
Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September-October 1983: Discharge, 56,600 ft^3/s 1330 hours Oct. 2, gage height, 15.84 ft.

1906 to August 1983: Discharge, 74,000 ft^3/s, gage height, 18 ft from floodmarks, from rating curve extended above 52,000 ft^3/s; occurred prior to 1924 probably on Jan. 19, 1916.

Remarks.--Flood-warning site.

(85) 09497500 Salt River near Chrysotile, Ariz.—Continued



(86) 09498500 Salt River near Roosevelt, Ariz.

Location.--Lat 33°37'10", long 110°55'15", in SE¼NE¼ sec.9, T.3 N., R.14 E. (unsurveyed), Gila County, Hydrologic Unit 15060103, in Tonto National Forest on left bank 100 ft downstream from State Highway 288, 0.3 mi downstream from Pinal Creek, 14 mi east of village of Roosevelt, and 17 mi upstream from Roosevelt Dam.

Drainage area.--4,306 mi².

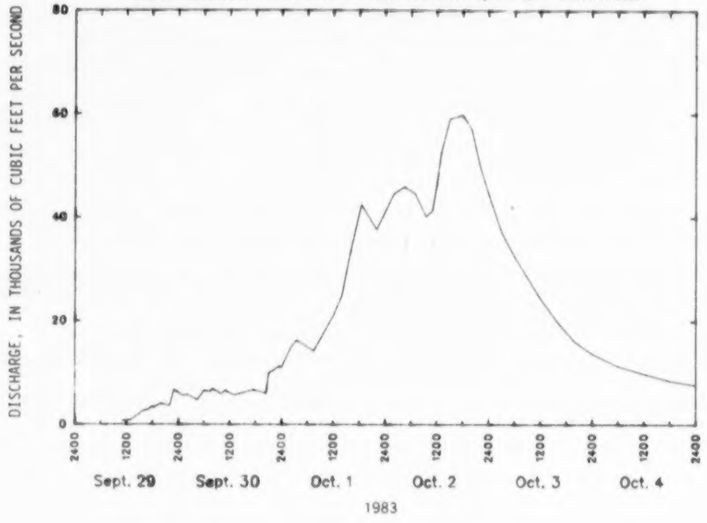
Gage-height record.--Water-stage recorder graph. Datum of gage is 2,177.14 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September-October 1983: Discharge, 59,800 ft³/s 1800 hours Oct. 2, gage height, 22.80 ft.

1906 to August 1983: Discharge, 117,000 ft³/s Mar. 14, 1941 from rating curve extended above 55,000 ft³/s on basis of velocity-area studies and float-area measurements at 66,000 ft³/s and 102,000 ft³/s. Gage height, 29.35 ft Dec. 19, 1978.

(86) 09498500 Salt River near Roosevelt, Ariz.—Continued



(87) 09501000 Reservoir system on Salt River at and below Roosevelt Dam, Ariz.

Location.--This system comprises four storage reservoirs created by four separate dams on Salt River: Roosevelt Lake, formed by Roosevelt Dam, in sec.20, T.4 N., R.12 E. (unsurveyed), Apache Lake, formed by Horse Mesa Dam, 17 mi downstream from Roosevelt Dam; Canyon Lake, formed by Mormon Flat Dam, 27 mi downstream from Roosevelt Dam, and Saguaro Lake, formed by Stewart Mountain Dam, 37 mi downstream from Roosevelt Dam. Hydrologic Unit 15060106.

Drainage area.--6,211 mi² at Stewart Mountain Dam.

Gage-height record.--Nonrecording gages read at intervals varying from once daily at 0800 hours during periods of low inflow to hourly during periods of high inflow.

Cooperation.--Records furnished by Salt River Valley Water Users' Association.

Maxima.--September-October 1983: Combined contents, 1,610,000 acre-ft 0800 hours Oct. 3.

1910 to August 1983: Combined contents, 1,764,000 acre-ft May 22, 1941.

Remarks.--Total capacity of the four reservoirs to top of spillway gates is 1,710,000 acre-ft, divided as follows: Roosevelt Lake, 1,337,000 acre-ft; Apache Lake, 245,000 acre-ft; Canyon Lake, 58,000 acre-ft; and Saguaro Lake, 70,000 acre-ft. Dead storage negligible. Dams forming these reservoirs were completed as follows: Roosevelt, 1911 (enlarged 1924); Horse Mesa, 1927; Mormon Flat, 1926; and Stewart Mountain, 1930. Since 1910, spill over Roosevelt Dam because of capacity or near-capacity storage has occurred in 1915, 1916, 1917, 1920, 1941, 1965, 1966, 1968, 1973, 1979, 1980, and 1983 water years. Reservoir contents reached 1,748,000 acre-ft in May 1979.

(87) 09501000 Reservoir system on Salt River at and below Roosevelt Dam, Ariz.—Continued

Contents, in thousands of acre-feet, at 0800 hours of indicated day, 1983

Day	Contents	Day	Contents	Day	Contents
Sept. 27. . . .	1,509.0	Oct. 1	1,539.0	Oct. 5	1,545.0
28. . . .	1,509.0	2	1,588.0	Oct. 6	1,518.0
29. . . .	1,510.0	3	1,610.0	Oct. 7	1,506.0
30. . . .	1,518.0	4	1,581.0		

(88) 09502000 Salt River below Stewart Mountain Dam, Ariz.

Location.--Lat 33°33'10", long 111°34'33", in NW¼NW¼ sec.6, T.2 N., R.8 E. (unsurveyed), Maricopa County, Hydrologic Unit 15060106, on left bank 3.5 mi downstream from Stewart Mountain Dam, and 6 mi upstream from Verde River.

Drainage area.--6,232 mi² of which 21 mi² is below Stewart Mountain Dam.

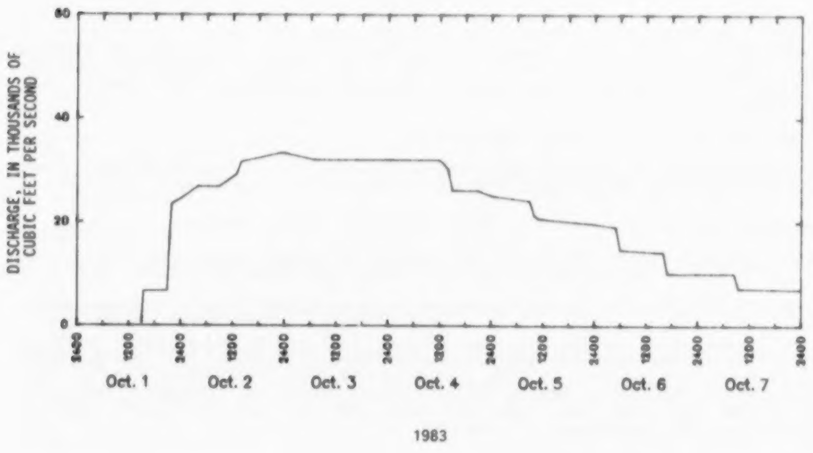
Gage-height record.--Water-stage recorder graph. Supplemented by water-stage recorder tape. Altituce of gage is 1,370 ft from topographic map.

Discharge record.--Stage-discharge relation extended above 21,900 ft³/s on basis of computation of flow over dam at gage height 22.4 ft.

Maxima.--September-October 1983: Discharge, 33,300 ft³/s 2300-2400 hours Oct. 2, gage height, 17.5 ft.

1930 to August 1983: Discharge, 75,200 ft³/s Feb. 15, 1980, gage height, 25.0 ft, from high-water mark in well.

Remarks.--Flow regulated by four reservoirs above station. (See sta 09501000).



(89) 09512190 Salt River at 24th Street, at Phoenix, Ariz.
(Partial-record station)

Location.--Lat 33°24'56", long 112°01'45", in NE¼ sec.22, T.1 N., R.3 E. Maricopa County, Hydrologic Unit 15060106, at 24th Street in Phoenix, 0.7 mi downstream from Interstate 10 bridge and 2.4 mi east of Phoenix Post Office.

Drainage area.--13.263 mi². (Includes drainage area of Salt River as well as Verde River.)

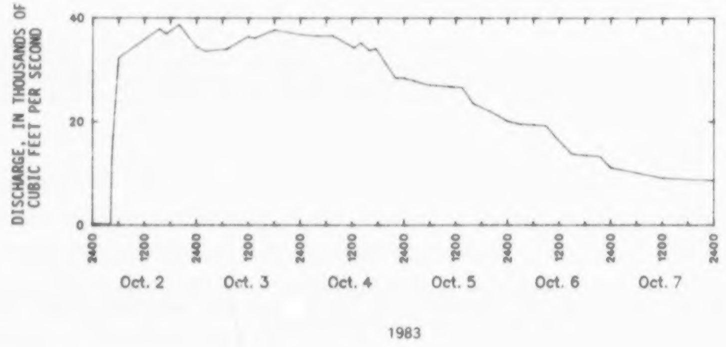
Gage-height record.--Water-stage recorder graph activated only during releases. Altitude of gage is 1,080 ft from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September-October 1983: Discharge, 38,700 ft³/s 2000 hours Oct. 2, gage height, 7.00 ft.

1888 to August 1983: Discharge, about 300,000 ft³/s Feb. 24, 1891 estimated on basis of records for former station at Arizona Dam 22 mi upstream.

Remarks.--Peak flow was the result of controlled releases regulated by reservoirs on the Salt River. Most of the flow originated in the drainage area above Salt River near Roosevelt.



(90) 09519500 Gila River below Gillespie Dam, Ariz.

Location.--Lat 33°13'45", long 112°46'00", in SE¼NE¼ sec.28, T.2 S., R.5 W., Maricopa County, Hydrologic Unit 15070101, at left end of Gillespie Dam, 8 mi downstream from Hassayampa River.

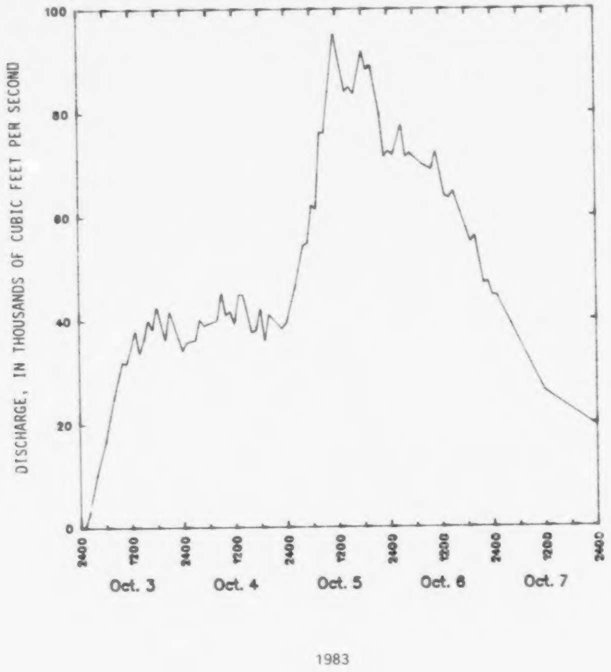
Drainage area.--49,650 mi².

Gage-height record.--Digital water-stage recorder tape. Datum of gage is 743.51 ft NGVD of 1929.

Discharge record.--Stage-discharge relation defined by current-meter measurements.

Maxima.--September-October 1983: Discharge, 95,200 ft³/s 1130 hours Oct. 5, gage height, 15.37 ft.
1921 to August 1983: Discharge, 178,000 ft³/s Feb. 16, 1980, gage height, 18.81 ft.
1891 to August 1983: Discharge estimated as 250,000 ft³/s in February 1891.

Remarks.--Flow partially regulated by San Carlos Reservoir on the Gila River since 1928 (see sta 09469000), by a system of reservoirs on the Salt River since 1910 (see sta 09501000), by a system of reservoirs on the Verde River since 1939 and by Lake Pleasant on the Agua Fria since 1927.



(91) Painted Rock Reservoir at Painted Rock Dam, Ariz.

Location.--Lat 33°04'30", long 113°00'50", in SE¼ sec.18, T.4 S., R.7 W., Maricopa County, Hydrologic Unit 15070201, at Painted Rock Dam, 19 mi northeast of Sentinel.

Drainage area.--50,910 mi² approximately.

Gage-height record.--Water-stage recorder graph. Record furnished by U.S. Army Corps of Engineers, Los Angeles District. Datum of gage is 0.0 ft NGVD of 1929.

Reservoir-contents record.--Capacity table furnished by U.S. Army Corps of Engineers, Los Angeles District.

Maxima.--September-October 1983: Contents, 528,600 acre-ft 1400 hours Oct. 24, 1983, gage height, 606.02 ft.
1959 to August 1983: Contents, 1,848,000 acre-ft Mar. 7, 1979, gage height, 647.80 ft.

Remarks.--Flood control reservoir is formed by earthfill dam completed in 1959, capacity 2,492,000 acre-ft. Last water from floods of October 1983 was released in February 1984.

Contents, in acre-feet, at 2400 hours of indicated day, 1983

Day	Contents	Day	Contents	Day	Contents
Oct. 1	28,300	Oct. 12	462,800	Oct. 22	522,800
2	28,300	13	467,600	23	527,400
3	33,400	14	474,500	24	528,400
4	81,600	15	482,800	25	526,000
5	172,900	16	489,300	26	524,400
6	309,600	17	494,800	27	520,600
7	373,500	18	503,700	28	516,300
8	402,400	19	508,000	29	512,700
9	421,100	20	510,000	30	509,400
10	437,500	21	516,600	31	505,800
11	449,700				

Change in contents, in acre-feet +477,500.

(92) 09519800 Gila River below Painted Rock Dam, Ariz.

Location.--Lat 33°04'30", long 113°00'50", in SE¼ sec.18, T.4 S., R.7 W., Maricopa County, Hydrologic Unit 15070201, on left bank 0.3 mi downstream from Painted Rock Dam, and 19 mi northeast of Sentinel.

Drainage area.--50,910 mi² approximately.

Gage-height record.--Water-stage recorder graph. Datum of gage is 518.69 ft NGVD of 1929 (levels by U.S. Army Corps of Engineers).

Discharge records.--Stage-discharge relation defined by current-meter measurements.

Maxima.--October 1983 to February 1984: Discharge, 4,000 ft³/s 2000 hours Nov. 7, gage height, 9.76 ft.
1959 to August 1983: Discharge, 9,190 ft³/s May 3, 1983, gage height, 10.57 ft Feb. 9, 1979.

Remarks.--Flow regulated by Painted Rock Reservoir since 1959 (capacity 2,492,000 acre-ft). Release of water from the flood began Oct. 6, 1983, and continued into February 1984. Daily discharges ranged from 105 to 4,000 ft³/s. See U.S. Geological Survey Water Resources Data for Arizona, 1984 water year

(93) 09535100 San Simon Wash near Pisinimo, Ariz.

Location.--Lat 32°02'39", long 112°22'13", in SE¼ sec.9, T.16 S., R.1 W. (unsurveyed), Pima County, Hydrologic Unit 15080101, in Papago Indian Reservation, on the right bank about 100 ft downstream from road, just upstream from Gu Vo Wash, and 3.2 mi west of Pisinimo.

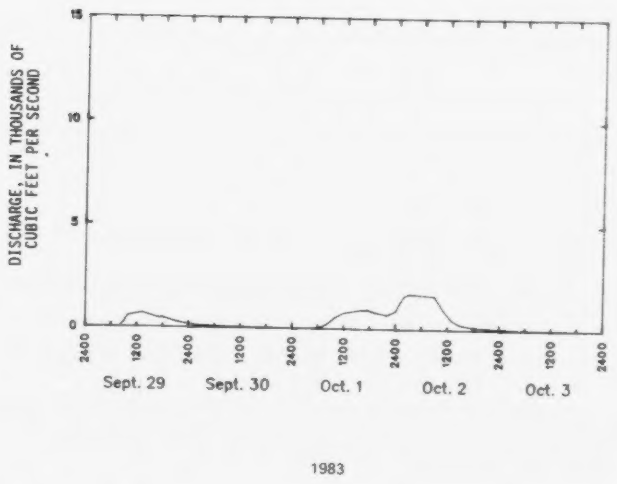
Drainage area.--569 mi².

Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 1,830 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements, slope-conveyance and culvert-computation estimates below 1,000 ft³/s and extended above on the basis of slope-area measurement at 12,500 ft³/s.

Maxima.--September-October 1983: Discharge, 1,700 ft³/s 0300 hours Oct. 2, gage height, 7.62 ft.

1972 to August 1983: Discharge, 12,500 ft³/s Sept. 24, 1976, gage height, 10.82 ft.



(94) 09535300 Vamori Wash at Kom Vo, Ariz.

Location.--Lat 31°57'04", long 112°20'50", in NW¼ sec.14, T.17 S., R.1 W. (unsurveyed), Pima County, Hydrologic Unit 15080101, in Papago Indian Reservation, on the right bank 200 ft downstream from road crossing, 0.6 mi south of Kom Vo (Santa Cruz Village) and 5 mi upstream from mouth.

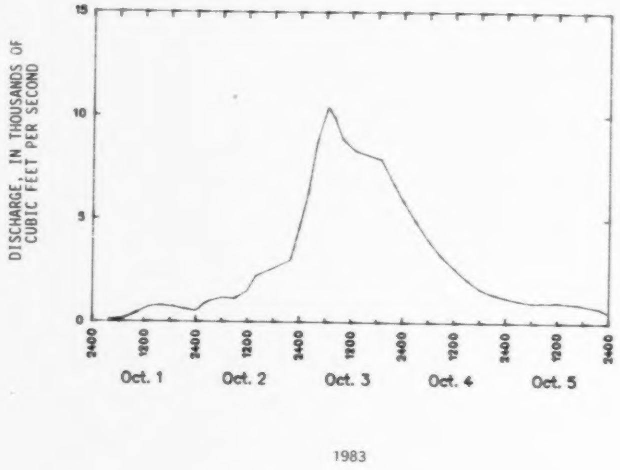
Drainage area.--1,250 mi², approximately, of which about 250 mi² is in Mexico.

Gage-height record.--Data-collection platform data. Altitude of gage is 1,770 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements, slope-conveyance estimate below 600 ft³/s and extended above on the basis of indirect measurement of peak flow.

Maxima.--September-October 1983: Discharge, 10,400 ft³/s 0630 hours Oct. 3, gage height, 10.54 ft.

1972 to August 1983: Discharge, 1,880 ft³/s Oct. 20, 1972, gage height, 9.44 ft from rating curve extended above 630 ft³/s.



(95) 09537200 Leslie Creek near McNeal, Ariz.

Location.--Lat 31°35'24", long 109°30'30", in SE¼NE¼ sec.20, T.21 S., R.28 W., Cochise County, Hydrologic Unit 15080301, on right bank 10 mi east of McNeal.

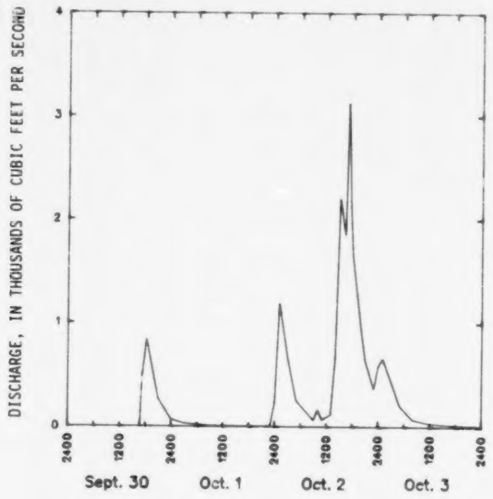
Drainage area.--79.1 mi².

Gage-height record.--Digital water-stage recorder tape. Altitude of gage is 4,620 ft, from topographic map.

Discharge record.--Stage-discharge relation defined by current-meter measurements below 12 ft³/s and extended above on the basis of slope-area measurements of peak flows at gage heights of 7.33 and 8.54 ft.

Maxima.--September-October 1983: Discharge, 3,130 ft³/s 1700 hours Oct. 2, gage height, 7.33 ft.

1970-77, 1982 to August 1983: Discharge, 1,760 ft³/s Aug. 12, 1971, gage height, 5.78 ft.



1983

(96) 09537500 Whitewater Draw near Douglas, Ariz.
(Former gaging station)

Location.--Lat 31°21'08", long 109°35'04", in SW¼SE¼ sec.10, T.24 S., R.27 E., Cochise County, Hydrologic Unit 15080301, on downstream side of pier of bridge on U.S. Highway 80, 1.5 mi upstream from international boundary and 2 mi west of Douglas.

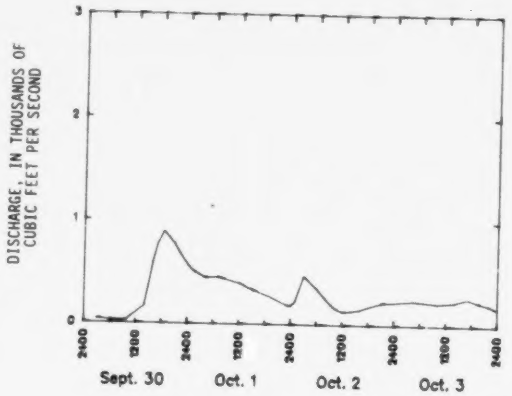
Drainage area.--1,023 mi².

Gage-height record.--Water-stage recorder graph. Datum of gage is 3,909.14 ft NGVD of 1929. Data Furnished by International Boundary and Water Commission.

Discharge record.--Stage-discharge relation extended above 500 ft³/s on the basis of area velocity study at 12.36 ft.

Maxima.--September-October 1983: Discharge, 891 ft³/s 1830 hours Sept. 30, gage height, 9.68 ft.

1916-20, 1930 to August 1983: Discharge, 5,060 ft³/s Aug. 7, 1955, gage height, 16.55 ft July 29, 1966.



1983

[NWS, National Weather Service; BLM, U.S. Bureau of Land Management; USFS, U.S. Forest Service, ARMY, U.S. Department of the Army; ASPS, Arizona Park Service; PCTY, Pima County; USGS, U.S. Geological Survey; INDV, Individuals. Blanks indicate no data

Sequence number	Station name	Source	Latitude and longitude	September-October 1983							
				09-27	09-28	09-29	09-30	10-01	10-02	10-03	Total
1	Ajo	NWS	32°22'112°52'			1.2		1.5	0.10		2.80
2	Anvil Ranch	NWS	31°59'111°23'		0.25	1.24	0.87	1.95	2.05	0.32	6.68
3	Apache Powder Co	NWS	31°54'110°15'	0.14	1.10	1.00	1.00	0.50	0.50		4.24
4	Arivaca 1 E	NWS	31°35'111°19'		1.28	0.22	1.54	2.47	2.52	0.23	8.26
5	Bisbee	NWS	31°26'109°55'	0.07	0.68	0.88	1.04	0.03	1.00	0.16	3.86
6	Black River Pumps	NWS	33°29'109°46'	0.44	0.07	0.53	1.20	0.97	1.95		5.16
7	Blue	NWS	33°37'109°06'		0.50	0.88	2.67	2.62	1.22	1.02	8.91
8	Bowie	NWS	32°20'109°29'	0.12	0.62	0.56	0.27	1.00	1.75	0.14	4.46
9	Canelo 1 NW	NWS	31°33'110°32'		0.40	1.88	1.17	0.55	1.01	0.40	5.41
10	Cascabel	NWS	32°19'110°24'	0.95	0.24	1.70	1.39	1.74	1.80	0.56	8.38
11	Chiricaha Nat Mon	NWS	32°00'109°21'		3.01	0.52	0.35	0.45	2.20	0.32	6.85
12	Coronado Nat Mon HQ	NWS	31°21'110°15'	0.04	0.36	1.03	0.65	0.05	2.12	0.01	4.26
13	Douglas	NWS	31°21'109°32'			0.62	1.40	0.08	1.16	0.45	3.71
14	Douglas FAA AP	NWS	31°28'109°36'	0.23	1.38	0.25	2.37	0.67	0.74	0.18	5.82
15	Duncan	NWS	32°45'109°07'	0.13	0.26	0.21	0.27	0.87	1.62	0.06	3.42
16	Eagle Creek 2	NWS	33°21'109°29'		0.04	0.31	2.31	0.91	3.02	0.12	6.71
17	Fort Thomas 2 SW	NWS	33°01'110°00'	0.20	0.11	0.20	0.82	2.80	1.60		5.73
18	Kitt Peak	NWS	31°58'111°36'			0.15	1.80	1.02	4.70	0.26	7.93
19	Mc Neal	NWS	31°36'109°34'		0.86	0.31	1.42		0.91		3.50
20	Mt Lemmon	NWS	32°27'110°45'		0.90	0.71		5.10	2.84	0.35	9.90
21	N Lazy H Ranch	NWS	32°07'110°41'		0.16		0.43	2.67	2.34	0.67	6.27
22	Nogales 6 N	NWS	31°25'110°57'			2.06	1.95	1.17	3.15	1.39	9.72
22	Nogales 6 N	NWS	31°25'110°57'			2.0	0.9	0.2	2.6	2.4	8.3
23	Organ Pipe Cactus Nat Mon	NWS	31°56'112°47'			1.57	0.07	1.75	0.62	0.40	4.41
24	Patagonia 2	NWS	31°33'110°45'	0.08	1.07	0.87	0.47	2.30	0.87	0.03	5.69
25	Portal 4 SW	NWS	31°53'109°12'	0.49	1.24	0.27	1.47	0.43	1.92	0.04	5.86
26	Redington	NWS	32°26'110°29'	0.15	0.61	0.65	1.97		5.45	0.50	9.33
27	Ruby Star Ranch	NWS	31°55'111°05'		0.62	1.65	2.30	2.00	2.10	0.10	8.77
28	Rucker Canyon	NWS	31°45'109°25'		1.45		1.30	0.15	2.20		5.10
29	Safford Experiment FR	NWS	32°49'109°41'	0.16	0.25	0.28	2.13	0.73	2.51	0.30	6.36
30	San Simon 9 ESE	NWS	32°10'109°05'	1.13	0.85	0.08	0.62	0.34	1.14	0.10	4.26
31	Santa Rita Exp Range	NWS	31°46'110°51'		1.08	1.60	1.32			4.77	8.77
32	Sasabe	NWS	31°29'111°33'			0.18	1.94	3.41	1.94	0.39	7.86
33	Sierra Vista	NWS	31°33'110°18'	0.05	1.54	0.74	0.50	0.80	1.05		4.68
34	Tombstone	NWS	31°42'110°03'		0.22	1.65		0.60	0.47	1.03	3.97
35	Tucson 17 NW	NWS	32°15'111°12'			1.34	1.30	1.94	2.16	0.24	6.98
36	Tucson Camp Ave Exp FM	NWS	32°17'110°57'			0.56	1.15	1.83	3.45	0.29	7.28
37	Tucson Magnetic Obsy	NWS	32°15'110°50'			0.34	1.46	2.30	2.57	0.65	7.32
38	Tucson University of Arizona	NWS	32°15'110°57'		0.38	0.91	0.56	4.16	1.31	0.21	7.53
39	Tucson University of Arizona No 1	NWS	32°16'111°00'		0.50	0.27	0.94	3.05	1.74	0.18	6.68
40	Tucson WSO AP	NWS	32°08'110°57'		0.31	1.02	0.48	2.96	1.21	0.73	6.71
41	Tumacacori Nat Mon	NWS	31°34'111°03'		0.96	1.58	0.56	3.63	2.67	0.14	9.54
42	Willcox	NWS	32°18'109°51'	0.04	0.79	0.72	1.57	1.44	2.12	0.55	7.23
43	Vail	NWS	32°02'110°43		1.1	0.70	0.20	2.50	2.00	0.30	6.80
44	Y Lightning Ranch	NWS	31°27'110°12'	0.25	0.85	0.57	0.94	1.16	0.84		4.61
45	Bartlett Dam	NWS	33°49'111°38'		0.58	1.89	0.83	0.46			3.76
46	Buckeye	NWS	33°22'112°35'			1.89					1.89
47	Carefree	NWS	33°49'111°54'			1.45	0.31	0.40		0.14	2.30
48	Casa Grande	NWS	32°52'111°44'			1.17	0.14	1.61	0.25		3.17
49	Casa Grande Ruins Nat Mon	NWS	33°00'111°32'		0.06	1.39	0.22	1.79	0.30		3.76
50	Chandler Heights	NWS	33°13'111°41'			1.30	0.40	1.07	0.52		3.29
51	Deer Valley	NWS	33°35'112°05'			1.67		0.33			2.00
52	Eloy	NWS	32°45'111°33'			0.88	0.33	2.26	1.00	0.04	4.51
53	Florence	NWS	33°02'111°23'		1.30	1.42	0.25	2.00	0.51	0.01	5.49
54	Fountain Hills	NWS	33°36'111°43'				1.95	0.60	0.48		3.03
55	Gila Bend	NWS	32°57'112°43'			1.20		0.18	0.07		1.45
56	Griggs 3 W	NWS	33°30'112°29'			1.17		0.13			1.30
57	Horseshoe Dam	NWS	33°59'111°43'			2.85	0.45	0.23	0.44		3.97
58	Kelvin	NWS	23°06'110°58'		0.63	2.02	0.96	1.70	1.08		6.39
59	Laveen 3 SSE	NWS	33°20'112°09'		0.05	1.76	0.23	0.88			2.92
60	Litchfield Park	NWS	33°30'112°22'			3.36		0.42			3.78
61	Maricopa 4 N	NWS	33°07'112°02'		0.09	1.21	0.06	1.10	0.14	0.01	2.61
62	Mesa Experiment Farm	NWS	33°2[illegible]'111°52'			0.48	1.27	0.70	0.20		2.65
63	Mormon Flat	NWS	33°33'111°27'			1.35	1.23	0.80	0.90		4.28
64	Oracle 2 SE	NWS	32°36'110°44'		0.50	0.55	1.08	2.56	1.90	0.17	6.76
65	Scottsdale	NWS	33°28'111°53'		0.82	1.28	0.07	0.80			2.97
66	Phoenix WSFO AP	NWS	33°26'112°01'		0.08	1.66		0.62			2.36
67	South Phoenix	NWS	33°23'112°04'		1.02	1.58	0.20	0.60	0.11		3.51
68	Phoenix City	NWS	33°27'112°04'	0.10	1.61	0.04		0.46	0.09		2.30
69	Stewart Mountain	NWS	33°34'111°32'			1.27	2.13	0.96	1.26		5.62
70	Sunflower 3 NNW	NWS	33°54'111°29'		0.73	2.57	0.98		0.20		4.48
71	Superior	NWS	33°18'111°06'		0.45	1.57	1.95		0.91		4.88
72	San Manuel	NWS	32°37'110°39'		0.27	0.68	1.05	2.34	1.81	0.11	6.26
73	Superior 2 ENE	NWS	33°18'111°04'		0.40	1.90	0.80	1.99	0.01		5.10
74	Tempe	NWS	33°26'111°56'			0.57	1.13	0.52	0.37		2.59
75	Tempe A S U	NWS	33°23'111°58'		0.49	1.48	0.10	0.68	0.13		2.88
76	Tolleson 1 E	NWS	33°27'112°14'				1.85	0.29	0.70		2.84
77	Wickenburg	NWS	33°59'112°44'			0.31	0.41	0.60			1.32
78	Youngtown	NWS	33°36'112°18'			2.25	0.26	0.18			2.69
79	Gisela	NWS	34°07'111°17'	0.33	0.01	0.51	2.26	0.98	0.60	0.12	4.81
80	Globe Ranger Stn	NWS	33°23'110°46'		0.12	0.62	3.14	1.21	2.00		7.09
81	Miami	NWS	33°24'110°53'	0.23	0.10	1.10	2.21	1.15	2.07	0.05	6.91
82	Payson	NWS	34°14'111°20'		0.10	2.20	1.61	0.85	0.05	0.08	4.89
83	Pleasant Valley R S	NWS	34°06'110°56'	0.50	2.00		0.52	3.14	0.34		6.50
84	Pumpkin Center	NWS	33°52'111°19'	0.12	0.12	0.67	2.00	1.90	0.90		5.71
85	Roosevelt 1 WNW	NWS	33°40'111°09'		0.01	0.77	1.24	0.30	1.42	0.02	3.76
86	San Carlos Reservoir	NWS	33°10'110°31'	0.42	0.04	0.21	0.77	2.30	2.92		6.66
87	Tonto Creek F H 2	NWS	34°21'111°08'			1.96	3.20				5.16
88	Castle Hot Springs	NWS	33°59'112°22'		0.15	1.00	0.21	0.72			2.08
89	Childs	NWS	34°21'111°42'			0.50	3.80	1.23	0.07		5.60
90	Cordes	NWS	34°18'112°10'		0.38	1.46	1.09	0.27	0.01		3.21
91	Crown King	NWS	34°12'112°20'			1.33	0.79	0.41			2.53
92	Hillside 4 NNE	NWS	34°29'112°53'			0.13	1.30				1.43
93	Irving	NWS	34°24'111°37'			0.40	3.27	1.73	0.04		5.44
94	Mayer NNW	NWS	34°26'112°15'		0.10	2.00	1.10	0.10			3.30
95	Sierra Ancha	NWS	33°48'110°58'		0.50	1.70	0.60	2.10			4.90
96	Workman Creek	NWS	33°49'110°55'		0.90	2.00	0.70	2.40	0.10		6.10
97	Walnut Grove	NWS	34°18'112°33'			0.57	0.40				0.97
98	Alpine	NWS	33°51'109°08'	0.58	0.42	0.70	2.60	1.60	1.33		7.23
99	Cameron 1 NNE	NWS	35°53'111 24'	0.22		0.13	0.60	0.02		0.02	1.04
100	Cibecue	NWS	34°02'110°29'		0.60	1.70	1.00	2.10	0.30		5.70
101	Clay Springs	NWS	34°23'110°19'	0.01	0.32	1.27	0.47	0.99	0.11		3.17
102	Greer	NWS	34°01'109°28'	0.64	0.92	0.98	1.45	1.45	0.95		6.39
103	Hawley Lake	NWS	33°59'109°45'	0.78	1.70	1.88	2.00	2.10	0.03		8.49
104	Heber Ranger Station	NWS	34°24'110°33'	0.29	0.02	1.55	0.48	0.99		0.16	3.49
105	Mc Nary	NWS	34°04'109°51'	0.80	0.16	1.23	1.16	1.37	1.85		6.57
106	Pinetop	NWS	34°07'109°56'	0.74	0.96	0.74	1.18	0.91	0.77		5.30
107	Pinetop Fish Hatchery	NWS	34°07'109°55'	0.89	0.43	0.80	1.30	1.19	0.85	0.04	5.50
		1.45	0.31 0.40								
108	Show Low City	NWS	34°15'110°02'	0.16	0.33	1.34	0.96	1.23	0.78		4.80
109	Snowflake	NWS	34°30'110°05'		0.23	1.45	0.62	0.86	0.33		3.49
110	Snowflake 15 W	NWS	34°30'110°20'	0.14		0.14	1.20	0.15	0.59		2.22
111	Springerville	NWS	34°08'109°17'	0.50	0.45	0.31	0.22	0.88	0.66		3.02
112	White River	NWS	33°50'109°58'	0.40	0.23	1.07	0.49	1.40	1.58		5.17
113	Beaverhead Ranger Station	NWS	33°25'108°07'	0.11	0.24	0.01	0.14	0.17	1.80	0.26	2.73
114	Fort Bayard	NWS	32°48'108°09'	0.26	0.77	0.20	0.66	0.51	2.34	0.32	5.06
115	Gila Hot Springs	NWS	33°12'108°13'	1.02	0.57	0.16	0.25	0.67	1.38	0.06	4.11
116	Luna Ranger Station	NWS	33°50'108°56'	0.35	0.14	0.57	2.14	1.35	1.23	0.02	5.80

Sequence number	Station name	Source	Latitude and longitude	September-October 1983							
				09-27	09-28	09-29	09-30	10-01	10-02	10-03	Total
117	Mimbres Ranger Station	NWS	32°56'108°01'	0.56	0.62	0.32	0.84	1.50	0.44	0.15	4.43
118	Quemado Ranger Station	NWS	34°21'108°30'	0.45	0.04	0.01	0.86	0.61	0.57	0.01	2.55
119	Reserve Ranger Station	NWS	33°43'108°47'	0.26	0.02	0.14	1.82	1.72	1.25		5.21
120	Animas	NWS	31°57'108°49'	0.45	1.70	0.15	0.77	0.05	1.45	0.33	4.90
121	Buckhorn	NWS	33°02'108°43'	0.15	0.35	0.07	0.27	0.84	2.07	0.06	3.81
122	Cliff 10 SE	NWS	32°52'108°31'	0.04	1.20	0.31	0.32	0.50	1.49	0.45	4.31
123	Cureton Ranch	NWS	32°32'108°34'		1.05	0.42	0.46	0.50	2.00	0.20	4.63
124	Deming	NWS	32°16'107°46'	0.83	0.35	0.55	0.18		0.93	0.58	3.42
125	Faywood	NWS	32°37'107°53'	0.47	0.38	0.20	0.78	0.12	1.10	0.12	3.17
126	Glenwood	NWS	33°20'108°53'	0.23	0.07	0.19	2.09	1.62	1.27	0.01	5.48
127	Hachita	NWS	31°56'108°19'	0.07	0.66	0.10	0.17		1.55	0.04	2.59
128	Lordsburg 4 SE	NWS	32°18'108°39'		1.15	0.22	0.57	0.34	0.93	0.44	3.65
129	Redrock 1 NNE	NWS	32°42'108°44'	0.24	0.65	0.24	0.18	0.33	1.70	0.22	3.56
130	White Signal	NWS	32°33'108°22'		0.41	1.02	0.67	0.61	1.18	0.12	4.01
131	Whitewater	NWS	32°33'108°08'	0.83	0.37	0.21	0.60	0.45	0.90		3.36
132	Tollhouse	BLM	32°52'109°17'	0.77	0.80	1.35	1.14	1.16	1.16		6.38
133	West Ranch	BLM	32°58'109°38'	0.01	0.04	1.58	1.84	2.51	0.16		6.14
134	Ash Peak	BLM	32°44'109°14'	0.11	0.29	0.72	0.73	1.70	0.70		4.25
135	Carlisle	BLM	32°47'109°01'	0.47	0.22	0.31	0.67	1.54	0.03		3.24
136	Elma	BLM	32°14'109°35'	1.35	1.30	0.08	0.85	1.70	0.24		5.52
137	Fan Dam	BLM	32°26'109°21'	0.45	0.60	0.35	0.78	1.72	0.68		4.58
138	Klondyke	BLM	32°50'110°20'		0.22	0.90	0.42	3.33	1.05		5.92
139	Oliver Knoll	BLM	33°04'109°52'	0.08	0.05	0.71	0.49	3.08	1.12		5.53
140	Saguaro	BLM	32°39'110°30'		0.30	0.80	0.29	3.74	1.11		6.24
141	West Aravaipa	BLM	32°54'110°34'		0.05	0.83	0.71	2.35	0.78		4.72
142	Pima Plots	BLM	32°54'109°60'	0.33	0.15	1.10	0.90	3.65	0.20		6.33
143	Christmas Mine	BLM	33°05'110°44'		0.24	0.61	1.61	1.75	1.05		5.26
144	Barrier Dam	BLM	32°47'109°37'	0.07	0.49	0.29	2.90		3.20		6.95
145	Castle Creek	USFS	33°42'109°11'								7.53
146	Profanity Ridge	USFS	33°55'109°08'								6.22
147	Hulsey Lake	USFS	33°55'109°09'								6.09
148	Milk Creek	USFS	33°56'109°09'								6.09
149	Woods Creek	USFS	33°58'109°07'								4.52
150	San Rafael	USFS	31°28'110°36'	0.06	1.40	1.80	0.90	1.35	0.70		6.21
151	Reagan	USFS	34°02'109°09'								3.91
152	Happy Valley	USFS	32°09'110°29'	0.44		0.70	2.80	1.21	2.75	1.60	9.50
153	Castle Creek Flume	USFS	33°42'109°11'								8.06
154	Gillespie Wash	USFS	32°32'109°45'	0.21	0.30	1.39	0.97	2.46	0.90	0.15	6.38
155	Log Canyon	USFS	33°42'109°12'								7.72
156	Cloverdale Ranch	USFS	31°25'108°57'		0.90	0.28	0.25	0.55	0.70	0.95	3.63
157	Oracle Ridge Mine	USFS	32°30'110°43'		0.97	2.44	2.15	4.30	0.63		10.49
158	Cochise Stronghold	USFS	31°55'109°58'	1.09	2.21	0.71	0.27	1.91	2.25		8.44
159	Parker Canyon	USFS	31°20'110°33'	0.20	1.15	1.25	0.85	1.50	1.05		6.00
160	X Ranch	USFS	32°30'110°11'	0.49	0.40	2.17	1.05	3.33	0.84	0.18	8.46
161	Willow Creek	USFS	33°40'109°19'	0.05	0.65	2.95	1.05	3.05			7.75
162	Thomas Creek	USFS	33°40'109°16'	0.33	0.78	1.77	1.22	2.35	0.83		7.28
163	Fort Huachuca	ARMY	31°20'110°12'	0.21	1.80	0.48	1.40	0.50	1.02	0.02	5.43
164	Blue	USFS	33°34'109°11'		0.34	3.20	1.60	2.85	0.06		8.05
165	Glenwood	USFS	33°19'108°53'		0.19	1.56		3.30			5.05
166	Luna	USFS	33°49'108°57'				2.30	1.90	1.10		5.30
167	Alpine	USFS	33°51'109°08'	0.07	0.80	0.50	2.80	1.67	1.30		7.14
168	Gila Center	USFS	33°14'108°15'	0.44	0.76	0.14	0.25	0.40	1.24	0.08	3.31
169	Blue River	USGS	33°17'109°12'	0.08	0.43	1.69	2.60	4.53	1.97		11.30
170	San Francisco River	USGS	33°03'109°18'	0.10	0.10	1.70	0.80	2.10	1.20		6.00
171	Eagle Creek	USGS	33°04'109°27'		0.43	1.54	1.38	3.27	1.10	0.24	7.96
172	San Simon River-Tanque	USGS	32°36'109°32'	0.40	0.10	0.50	0.50	1.20	1.40		4.10
173	San Pedro-Redington	USGS	32°23'110°27'		0.40	0.90	0.80	3.80	1.80	0.20	7.90
174	Santa Cruz-Continental	USGS	31°52'110°59'		0.30	0.60	0.70	3.10	1.10	0.10	5.90
175	Tanque Verde Creek	USGS	32°15'110°41'		0.40	1.00	0.20	3.00	2.00	0.70	7.30
176	Sabino Creek	USGS	32°19'110°49'		0.60	0.80	0.80	3.20	1.60	0.20	7.20
177	White River-Apache	USGS	33°44'110°10'	0.08	1.48	1.12	1.04	2.68	1.08		7.48
178	Salt River-Chrysotile	USGS	33°48'110°30'		0.40	1.90	1.60	1.70	0.70	0.10	6.40
179	Cherry Creek-Globe	USGS	33°50'110°51'		0.56	1.44	0.96	3.12	0.32		6.40
180	Dry Beaver Creek-Rimrock	USGS	33°44'111°46'		0.08	1.20	1.12				2.40
181	East Verde River-Childs	USGS	34°17'111°39'		0.10	1.10	0.90	1.50	0.80		4.30
182	Sycamore-McDowell	USGS	33°42'111°32'		0.50	1.80	0.70	0.90	0.20		4.10
183	Carrizo Creek-Show Low	USGS	33°59'110°17'		0.50	2.00	1.50	2.30	0.60		6.90
184	Black River-Point of Pines	USGS	33°28'109°46'	0.10	0.50	1.40	0.80	2.30	1.10		6.20
185	Golder Ranch	PCTY	33°32'110°53'	0.64	0.60	0.48	2.52	0.68			4.92
186	Oracle Ranger Station	PCTY	32°36'110°47'	0.52	0.68	0.36	2.92	0.44			4.92
187	Oracle Ridge	PCTY	32°32'110°45'	0.52	0.96	0.44	3.36	0.76			6.04
188	Pig Spring	PCTY	32°32'110°48'		0.16	0.76	0.40	3.00	0.44		4.76
189	Cherry Spring	PCTY	32°31'110°50'		0.04	0.84	0.60	2.84	0.56		4.88
190	Dodge Tank	PCTY	32°31'110°52'			0.72	0.60	2.64	0.60		4.56
191	Canada del Oro	PCTY	32°29'110°54'		0.20	0.56	0.56	2.92	0.72		4.96
192	Clifton	INDV	33°03'109°18'					5.00		2.50	7.50
193	York Valley	INDV	32°56'109°12'		0.27	1.52	1.31	0.96	1.65	0.49	6.20
194	Apache Creek	INDV	32°60'109°05'	0.74	0.22	1.20	1.00	2.00	0.54		5.70
195	Ranch Salano	PCTY	32°34'110°51'		0.84	0.72	0.52	2.76	0.64		5.48
196	Chiricahua Trial Ranch	INDV	32°13'109°43'		0.98	0.29	0.33	1.25	0.69	0.22	3.76
197	Willcox-Airport Road	INDV	32°14'110°00'	0.92	0.52	1.72	1.85	0.92	0.25		6.18
198	Green Valley	INDV	31°51'110°58'		0.40	1.62	0.22	4.15	1.00	0.40	7.79
199	Rio Rico	INDV	31°28'110°59'		1.52	1.08	0.04	4.00	0.94	0.09	7.67
200	Robles Junction	INDV	32°05'111°18'		0.90	0.40	1.30	3.55	2.30	0.65	9.10
201	Sierra Vista	INDV	31°33'110°18'		1.80	0.91	0.31	1.35	0.70	0.02	5.09
202	Ramsey Canyon	INDV	31°27'110°19'		0.37	1.32	1.20	0.76	2.43	0.47	6.55
203	Douglas	INDV	31°27'109°28'		1.40	0.46	1.40	0.20	1.02	0.11	4.59
204	Safford	INDV	32°49'109°43'	0.65	0.22	1.70	0.54	2.51	0.94	0.03	6.59
205	T6S-R22E-SEC30	INDV	32°53'110°09'								4.97
206	T7S-R22E-SEC7	INDV	32°50'110°08'								7.46
207	Marana	INDV	32°26'111°13'								7.35
208	Vail	INDV	32°03'110°43'		0.32	1.00	0.58	3.12	1.18	0.31	6.51
209	Arizona City	INDV	32°45'111°40'			0.75	0.15	1.75	0.60		3.25
210	Casa Grande	INDV	32°52'111°45'		1.40	0.50	2.10				4.05
211	Coolidge	INDV	32°58'111°31'		0.50	1.20	0.28	1.96	0.56	0.17	4.67
212	Patagonia Lake State Park	ASPS	31°30'110°50'		2.00	0.70	0.70	2.75	1.00	0.07	7.22
213	Patagonia	INDV	31°32'110°45'	0.05	1.35	0.96	0.48	3.15	0.36	0.05	6.40
214	HWY 82-M.P. 23	INDV	31°34'110°44'		1.60	0.90	0.65	3.20	1.35		7.70
215	Sonita	INDV	31°39'110°39'		3.40	1.00	0.52	3.60	0.70		9.22
216	Tubac	INDV	31°37'111°03'		1.05	1.30	0.40	3.43	0.38	0.03	6.59
217	Nogales	INDV	31°21'110°56'		2.90	1.90		1.45			6.25
218	T13S-R15E-SEC30	INDV	32°18'110°46'		0.36	0.90	0.76	3.05	2.10	0.54	7.71
219	T17S-R15E-SEC2	INDV	31°59'110°47'		0.60		0.80	2.10	3.00	0.40	6.90
220	Tucson Mountains	INDV	32°09'111°06'		0.64	1.44	1.52	3.85	0.64		8.09
221	T14S-R15E-SEC29	INDV	32°11'110°45'		0.44	0.54	1.32	2.22	1.40	0.55	6.47
222	T14S-R14E-SEC11	INDV	32°14'110°53'		0.28		1.63	3.55	1.82	0.46	7.74
223	T14S-R15E-SEC10	INDV	32°14'110°48'		0.40	1.15	0.15	5.60	0.90	0.40	8.60
224	Tyrone, NM	INDV	32°42'108°18'	0.18	0.14	0.22	0.45	1.82	0.23	0.01	3.05
225	Bill Evans Lake, NM	INDV	32°51'108°34'		0.66	0.40	0.09	0.42	0.70	0.27	2.54
226	Silver City, NM	INDV	32°47'108°17'	0.03	0.74	0.25	0.59	0.48	2.39	0.10	4.58

(3) 09384000 Little Colorado River above Lyman Lake, near St. Johns, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-29	2400	1.95	34	10-02	0600	5.90	1,440
09-30	0800	1.83	28	10-02	1200	5.60	1,210
09-30	1200	2.78	108	10-02	1700	6.55	1,990
09-30	1800	3.25	188	10-02	2000	6.90	2,330
09-30	2100	3.97	365	10-02	2400	6.50	1,890
09-30	2400	3.95	359	10-03	0600	5.80	1,320
10-01	1500	4.05	389	10-03	1200	5.40	1,008
10-01	1600	4.19	435	10-03	1800	4.92	726
10-01	1800	3.94	356	10-03	2400	4.62	581
10-01	2100	4.45	532	10-04	1200	4.12	392
10-01	2200	4.65	623	10-04	1800	3.86	316
10-01	2330	4.94	768	10-04	2400	3.82	306
10-01	2400	5.40	1,050	10-05	1200	3.64	260
10-02	0200	6.15	1,640	10-05	2400	3.41	208

(4) 09430500 Gila River near Gila, N.Mex.

10-01	0600	1.83	442	10-04	1200	4.21	3,020
10-01	1200	2.21	638	10-04	2400	3.60	2,160
10-01	1800	2.74	1,010	10-05	1200	3.13	1,560
10-01	2400	3.27	1,560	10-05	2400	2.69	1,150
10-02	0600	3.93	2,180	10-06	1200	2.45	911
10-02	0900	4.93	3,830	10-06	2400	2.18	729
10-02	1200	6.63	8,060	10-07	1200	1.98	620
10-02	1800	7.43	10,600	10-07	2400	1.79	515
10-02	2115	8.42	14,100	10-08	1200	1.67	470
10-02	2400	8.27	13,500	10-08	2400	1.54	405
10-03	0600	7.43	10,600	10-09	1200	1.45	375
10-03	1200	6.56	7,780	10-09	2400	1.35	332
10-03	1800	5.82	5,940	10-10	1200	1.29	324
10-03	2400	5.31	4,960	10-10	2400	1.20	288

(5) 09430600 Mogollon Creek near Cliff, N. Mex.

09-30	0600	2.16	110	10-02	1800	5.65	1,300
09-30	1200	2.43	152	10-02	2400	4.97	905
09-30	2400	3.22	365	10-03	1200	4.00	480
10-01	1200	3.74	566	10-03	2400	3.46	300
10-01	2400	4.81	1,090	10-04	1200	3.08	255
10-02	0600	3.91	444	10-04	2400	2.85	200
10-02	1200	6.10	1,620	10-05	1200	2.67	158
10-02	1500	6.50	1,920	10-05	2400	2.51	126

(7) 09431500 Gila River near Redrock, N. Mex.

09-28	1200	6.07	294	10-03	0600	14.94	17,300
09-28	2400	6.37	425	10-03	1200	12.99	12,300
09-29	1200	6.72	648	10-03	1800	10.60	6,920
09-29	2400	6.70	630	10-03	2400	9.73	5,380
09-30	1200	6.76	708	10-04	1200	8.56	3,620
09-30	2400	6.84	779	10-04	2400	7.67	2,490
10-01	1200	7.28	1,890	10-05	1200	7.38	2,000
10-01	1800	7.70	2,230	10-05	2400	7.03	1,700
10-01	2400	8.98	3,860	10-06	1200	6.81	1,470
10-02	0600	9.81	5,130	10-06	2400	6.61	1,300

(7) 09431500 Gila River near Redrock, N. Mex.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-02	1200	10.61	6,460	10-07	1200	6.45	1,140
10-02	1400	13.34	12,600	10-07	2400	6.26	1,010
10-02	1530	19.26	24,800	10-08	1200	6.19	950
10-02	1600	18.43	24,500	10-08	2400	5.96	800
10-02	2000	16.78	20,900	10-09	1200	5.91	740
10-02	2400	16.32	19,800	10-09	2400	5.70	600

(8) 09432000 Gila River below Blue Creek, near Virden, N.Mex.

09-30	2400	3.19	470	10-02	1830	13.8	15,500
10-01	0600	3.20	473	10-02	2200	12.78	13,200
10-01	1000	3.65	650	10-02	2400	12.90	13,400
10-01	1200	3.70	671	10-03	0500	13.4	14,600
10-01	1400	4.15	889	10-03	1200	11.8	11,100
10-01	1700	3.89	757	10-03	1800	10.4	8,480
10-01	2030	4.18	905	10-03	2400	9.48	6,970
10-01	2100	4.70	1,220	10-04	0600	8.15	5,010
10-01	2400	4.85	1,320	10-04	1200	7.50	4,090
10-02	0700	5.88	2,180	10-04	2400	6.55	2,900
10-02	0800	6.90	3,320	10-05	0600	6.15	2,450
10-02	0900	8.25	6,030	10-05	1200	5.92	2,220
10-02	1200	9.75	7,390	10-05	2400	5.50	1,830
10-02	1500	8.92	6,130	10-06	0600	5.38	1,720
10-02	1700	12.20	11,900	10-06	2400	4.85	1,310

(9) 09442000 Gila River near Clifton, Ariz.

09-27	1800	1.98	67	10-01	1100	8.50	4,200
09-27	1900	7.42	3,950	10-01	1130	9.67	5,800
09-27	2000	5.10	1,330	10-01	1300	8.20	3,670
09-27	2100	3.83	585	10-01	1530	6.20	1,670
09-27	2400	2.55	149	10-01	1730	6.55	1,960
09-28	0400	2.20	94	10-01	1830	6.22	1,680
09-28	1220	2.20	94	10-01	2000	7.62	2,980
09-28	2400	2.18	91	10-01	2130	8.00	3,420
09-29	0600	2.30	107	10-01	2400	6.80	2,170
09-29	1200	2.36	117	10-02	0300	5.45	1,150
09-29	1730	2.43	128	10-02	0630	5.00	886
09-29	1800	2.65	168	10-02	0730	5.20	1,000
09-29	1900	4.26	802	10-02	0800	8.00	3,420
09-29	1930	4.05	685	10-02	0830	8.90	4,620
09-29	2000	6.30	2,400	10-02	0900	9.70	5,850
09-29	2100	9.70	8,480	10-02	1000	13.4	14,000
09-29	2200	8.00	4,900	10-02	1030	13.8	15,300
09-29	2300	5.90	2,010	10-02	1200	11.5	9,250
09-29	2400	5.70	1,830	10-02	1300	11.95	10,200
09-30	0200	5.10	1,320	10-02	1500	10.3	6,890
09-30	0500	3.85	585	10-02	1730	8.75	4,400
09-30	0800	3.40	396	10-02	2100	9.40	5,370
09-30	0930	3.44	411	10-02	2400	8.80	4,470
09-30	1100	3.34	373	10-03	0700	9.00	4,760
09-30	1200	4.30	820	10-03	1200	11.1	8,420
09-30	1230	5.46	1,610	10-03	2030	12.95	12,700
09-30	1400	4.70	989	10-03	2400	12.5	11,600
09-30	1600	3.92	620	10-04	1200	10.2	6,710
09-30	1800	3.68	502	10-04	1800	9.30	5,210
09-30	2000	3.69	507	10-04	2400	8.65	4,270

(9) 09442000 Gila River near Clifton, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-30	2100	3.75	536	10-05	1200	7.30	2,630
09-30	2400	3.55	453	10-05	2400	6.55	1,910
10-01	0800	3.31	368	10-06	1200	6.07	1,520
10-01	0900	4.00	620	10-06	2400	5.75	1,280
10-01	1030	5.00	1,120				

(12) 09442680 San Francisco River near Reserve, N.Mex.

09-29	1200	2.70	137	10-01	2400	5.95	3,730
09-29	2400	3.46	440	10-02	0600	5.00	2,510
09-30	0200	3.75	780	10-02	0300	7.14	5,130
09-30	0300	5.47	3,160	10-02	1000	8.06	6,230
09-30	0600	5.48	3,170	10-02	1200	7.46	5,520
09-30	1000	6.62	4,540	10-02	1800	5.44	3,080
09-30	1200	8.45	6,700	10-02	2400	4.87	2,330
09-30	1300	9.60	7,840	10-03	1200	4.47	1,730
09-30	1800	7.37	5,440	10-03	2400	4.14	1,240
09-30	2400	5.73	3,480	10-04	1200	3.85	830
10-01	0600	4.95	2,500	10-04	2400	3.40	380
10-01	1200	6.89	4,860	10-05	1200	3.25	345
10-01	1500	9.34	7,580	10-05	2400	3.00	220
10-01	1700	11.71	9,830	10-06	1200	2.90	215
10-01	2100	7.95	6,130				

(14) 09442692 Tularosa River above Aragon, N.Mex.

10-01	1200	1.51	14	10-02	1800	2.73	176
10-01	1500	1.51	14	10-02	2400	2.33	75
10-01	1800	2.06	38	10-03	0600	2.12	35
10-01	2000	2.50	110	10-03	1200	1.89	24
10-01	2400	2.51	113	10-03	2400	1.55	12
10-02	0600	2.27	66	10-04	1200	1.34	8.6
10-02	0800	2.85	210	10-04	2400	1.20	5.8
10-02	1000	3.56	485	10-05	1200	1.12	4.7
10-02	1015	3.90	660	10-05	2400	1.06	3.5
10-02	1200	3.12	304				

(18) 094430000 San Francisco River near Alma, N.Mex.

09-29	1200	2.21	117	10-02	2400	8.1	7,200
09-29	2400	2.96	435	10-03	0600	8.0	7,000
09-30	0600	4.31	1,430	10-03	1200	7.7	6,500
09-30	1200	8.21	7,420	10-03	1800	6.9	5,000
09-30	1700	11.5	17,000	10-03	2400	6.3	3,880
09-30	2000	9.5	11,000	10-04	1200	4.7	1,800
09-30	2400	8.0	7,000	10-04	2400	4.3	1,420
10-01	0030	7.5	6,040	10-05	1200	4.30	1,270
10-01	0400	7.0	5,180	10-05	2400	3.96	1,040
10-01	0700	9.3	10,400	10-06	1200	3.67	856
10-01	1200	12.2	19,800	10-06	2400	3.47	784
10-01	1600	17.0	38,800	10-07	1200	3.38	688
10-01	2000	12.6	21,600	10-07	2400	3.29	680
10-01	2400	10.9	14,700	10-08	1200	3.28	608
10-02	0300	10.5	12,900	10-08	2400	3.19	566

(18) 094430000 San Francisco River near Alma, N.Mex.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-02	0600	12.2	19,900	10-09	1200	3.15	566
10-02	0900	21.44	56,600	10-09	2400	3.10	536
10-02	1200	13.9	26,800	10-10	1200	3.08	512
10-02	1800	11.0	14,800	10-10	2400	2.96	440
10-02	2100	10.5	13,200				

(19) 09444000 San Francisco River near Glenwood, N.Mex.

09-29	1800	1.93	69	10-02	1600	17.72	28,100
09-29	2000	3.32	427	10-02	1800	18.39	30,100
09-29	2400	2.53	198	10-02	2100	16.77	25,300
09-30	0100	3.60	635	10-02	2400	14.36	19,300
09-30	0600	4.46	1,160	10-03	0600	11.31	12,400
09-30	1200	5.82	2,350	10-03	1200	9.19	7,930
09-30	1400	8.29	5,680	10-03	1800	7.64	5,250
09-30	1800	10.55	9,870	10-03	2400	6.66	3,860
09-30	2200	11.01	10,900	10-04	1200	5.63	2,670
09-30	2400	10.50	9,760	10-04	2400	4.70	1,780
10-01	0800	9.09	7,290	10-05	1200	4.18	1,310
10-01	1000	9.81	8,650	10-05	2400	3.68	982
10-01	1200	11.92	13,200	10-06	1200	3.43	834
10-01	1500	13.14	15,900	10-06	2400	3.15	688
10-01	1700	16.61	24,400	10-07	1200	2.99	605
10-01	1900	18.06	28,600	10-07	2400	2.71	492
10-01	2100	17.63	27,300	10-08	1200	2.53	420
10-01	2200	18.00	28,400	10-08	2400	2.55	428
10-01	2400	17.43	26,700	10-09	1200	2.42	381
10-02	0600	15.68	22,600	10-09	2400	2.31	346
10-02	0900	17.41	27,100	10-10	1200	2.29	339
10-02	1115	20.8	37,100	10-10	2400	2.03	256
10-02	1200	20.37	36,000				

(20) 09444100 Campbell Blue Creek near Alpine, Ariz.

09-30	0600	2.22	32	10-02	0100	4.38	187
09-30	0945	3.22	83	10-02	0300	4.75	232
09-30	1800	2.39	38	10-02	0500	5.70	375
09-30	2400	2.22	32	10-02	0615	6.35	498
10-01	0500	2.11	28	10-02	0915	6.00	429
10-01	0900	3.04	72	10-02	1115	6.90	619
10-01	1100	4.19	167	10-02	1300	5.21	296
10-01	1145	5.04	272	10-02	1500	4.85	245
10-01	1415	5.75	384	10-02	1915	4.22	170
10-01	1515	5.33	314	10-02	2400	3.58	110
10-01	1800	5.85	402	10-03	0730	2.70	53
10-01	1900	4.82	242	10-03	1200	2.36	37
10-01	2400	4.41	191	10-03	2400	2.14	29

(23) 09444200 Blue River near Clifton, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-29	1630	4.92	65	10-01	1200	19.70	20,400
09-29	1730	6.25	305	10-01	1300	21.00	24,300
09-29	1830	5.95	228	10-01	1500	-----	16,000
09-29	1900	7.19	666	10-01	1900	-----	7,000
09-29	1930	7.60	881	10-01	2400	-----	3,700
09-29	2130	7.30	719	10-02	0300	-----	3,000
09-29	2300	8.10	1,200	10-02	0500	-----	2,500
09-29	2330	8.05	1,160	10-02	0600	-----	15,000
09-29	2400	8.16	1,240	10-02	0700	-----	23,500
09-30	0130	8.69	1,660	10-02	0900	-----	15,000
09-30	0330	8.12	1,210	10-02	1200	-----	8,400
09-30	0500	8.76	1,720	10-02	1600	-----	4,200
09-30	0600	8.81	1,770	10-02	2400	-----	2,500
09-30	0800	9.76	2,520	10-03	0600	-----	2,000
09-30	0900	11.86	4,730	10-03	1200	-----	1,500
09-30	1000	13.26	6,670	10-03	1800	-----	1,100
09-30	1200	13.68	7,300	10-03	2400	-----	1,000
09-30	1400	13.66	7,280	10-04	0600	-----	900
09-30	1530	-----	2,030	10-04	1200	-----	800
09-30	1800	-----	4,290	10-04	1800	-----	800
09-30	2400	-----	5,300	10-04	2400	-----	700
10-01	1000	-----	6,730	10-05	1200	-----	610
10-01	1100	16.31	12,700	10-05	2400	-----	530

(24) 09444500 San Francisco River at Clifton, Ariz.

09-29	1600	2.19	238	10-01	0900	10.82	26,100
09-29	1630	3.28	665	10-01	1200	12.77	32,700
09-29	1830	2.57	349	10-01	1400	17.23	59,500
09-29	1900	2.70	385	10-01	1615	19.60	89,600
09-29	2130	2.85	448	10-01	2000	16.99	65,500
09-29	2300	3.55	906	10-01	2200	17.82	73,500
09-29	2400	4.35	1,780	10-01	2400	16.36	58,500
09-30	0130	5.26	3,610	10-02	0600	15.66	52,800
09-30	0330	5.40	3,970	10-02	0800	17.41	71,800
09-30	0530	6.05	5,630	10-02	0945	19.72	90,900
09-30	0930	6.08	5,710	10-02	1100	18.56	77,400
09-30	1100	7.70	10,100	10-02	1200	16.99	63,900
09-30	1130	9.30	15,600	10-02	1500	16.03	49,100
09-30	1200	9.32	15,700	10-02	1800	13.57	37,700
09-30	1330	9.78	17,600	10-02	2100	11.51	30,800
09-30	1400	9.48	16,300	10-02	2400	11.43	30,000
09-30	1500	9.60	16,800	10-03	0600	9.19	21,000
09-30	1630	9.60	16,800	10-03	1200	8.12	15,000
09-30	1730	9.55	16,600	10-03	1800	7.58	11,000
09-30	1830	9.15	15,100	10-03	2400	6.91	7,800
09-30	2000	8.85	14,000	10-04	0600	6.57	7,010
09-30	2100	9.54	16,600	10-04	1200	6.18	5,980
09-30	2200	9.55	16,600	10-04	2400	5.14	3,320
09-30	2300	9.65	17,000	10-05	0600	4.91	2,800
09-30	2400	9.59	16,800	10-05	1200	4.78	2,530
10-01	0300	9.85	18,200	10-05	2400	4.35	1,780
10-01	0600	10.24	19,500				

(29) San Simon River at Barrier Detention Dam, near Solomon, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-01	0600	0.15	40	10-02	0730	2.70	4,750
10-01	0900	1.00	1,030	10-02	0900	2.60	4,480
10-01	1130	1.35	1,640	10-02	1030	2.80	5,010
10-01	1500	1.15	1,280	10-02	1400	2.50	4,220
10-01	1900	1.24	1,440	10-02	1800	1.95	2,890
10-01	2400	1.06	1,130	10-02	2100	1.65	3,440
10-02	0500	.84	782	10-02	2400	1.24	1,440
10-02	0700	2.50	4,220				

(31) 09466500 Gila River at Calva, Ariz.

09-29	2400	2.70	284	10-02	1200	22	130,000
09-30	0700	2.71	287	10-02	1500	20.5	114,000
09-30	0800	4.45	1,310	10-02	1900	19	96,000
09-30	1000	5.10	2,060	10-02	2300	19	96,000
09-30	1200	5.20	2,220	10-02	2400	19.1	97,000
09-30	1400	5.50	2,630	10-03	0300	23.1	150,000
09-30	1600	6.70	4,150	10-03	0600	21.1	121,000
09-30	1700	6.90	4,600	10-03	0900	19.7	104,000
09-30	2000	6.55	3,890	10-03	1400	17.1	76,200
09-30	2300	6.70	4,150	10-03	1900	14.9	56,100
09-30	2400	6.60	3,950	10-03	2400	13.84	47,600
10-01	0800	6.60	3,550	10-04	0100	13.7	46,500
10-01	1200	7.30	5,470	10-04	0600	13.1	42,000
10-01	1900	10.00	15,800	10-04	1200	12.15	36,000
10-01	2200	11.10	21,800	10-04	1800	10.88	28,600
10-01	2400	11.50	24,200	10-04	2400	9.46	21,300
10-02	0300	12.05	27,300	10-05	0600	8.26	16,100
10-02	0500	13.1	35,000	10-05	1200	7.20	12,100
10-02	0800	15.6	55,300	10-05	1800	6.40	9,290
10-02	1000	20	104,000	10-05	2400	5.80	7,480
10-02	1100	22	130,000				

(32) 09468500 San Carlos River near Peridot, Ariz.

09-28	0630	4.35	190	10-01	1800	8.35	7,550
09-28	0800	5.80	1,620	10-01	1900	8.10	6,800
09-28	1300	4.80	497	10-01	2000	8.09	6,770
09-28	1600	4.70	416	10-01	2300	6.95	4,000
09-28	1615	6.56	3,040	10-01	2400	6.89	3,880
09-28	1630	6.42	2,740	10-02	0100	6.60	3,200
09-28	1730	6.80	3,500	10-02	0130	6.70	3,390
09-28	2000	5.44	1,160	10-02	0200	6.58	3,160
09-28	2400	5.18	861	10-02	0300	7.63	5,580
09-29	2400	5.15	830	10-02	0500	7.35	4,920
09-30	1600	5.0	680	10-02	0600	7.90	6,260
09-30	1800	7.9	6,260	10-02	0700	9.45	11,100
09-30	2400	7.0	4,110	10-02	0800	8.85	9,050
10-01	0830	6.03	1,970	10-02	0900	8.85	9,050
10-01	0930	6.21	2,300	10-02	1030	8.65	8,450
10-01	1030	7.10	4,250	10-02	1200	7.80	6,010
10-01	1130	7.95	6,400	10-02	1530	6.65	3,360
10-01	1400	8.88	9,140	10-02	1800	6.69	3,400
10-01	1430	9.24	10,300	10-02	2400	6.20	2,280
10-01	1500	8.75	8,750	10-03	1200	5.55	1,240
10-01	1600	8.50	8,000	10-03	2400	5.05	708

(36) 09470500 San Pedro River at Palominas, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-27	1700	3.65	20	10-02	0200	4.75	330
09-27	1800	7.65	2,060	10-02	0400	4.88	382
09-27	1900	7.32	1,800	10-02	0700	5.32	570
09-27	2030	10.10	4,580	10-02	1030	5.03	442
09-27	2200	6.00	910	10-02	1200	5.30	560
09-27	2400	5.48	650	10-02	1500	8.85	3,170
09-28	0600	4.30	167	10-02	1630	7.95	2,320
09-28	1230	4.20	138	10-02	1800	9.32	3,640
09-28	1430	4.68	304	10-02	1900	10.95	5,650
09-28	1530	4.54	253	10-02	2000	12.15	7,330
09-28	1700	5.51	665	10-02	2130	12.69	8,180
09-28	1830	5.46	640	10-02	2300	11.70	6,700
09-28	2100	5.67	745	10-02	2400	10.25	4,760
09-28	2300	6.08	950	10-03	0300	8.05	2,420
09-28	2400	6.11	966	10-03	0600	7.34	1,810
09-29	0100	6.16	996	10-03	1230	6.75	1,380
09-29	0600	5.27	545	10-03	1500	7.12	1,640
09-29	1200	4.69	307	10-03	1900	6.72	1,350
09-29	2400	4.51	244	10-03	2130	6.71	1,350
09-30	1300	4.47	226	10-03	2330	6.50	1,200
09-30	1430	4.99	426	10-03	2400	6.50	1,200
09-30	1530	4.92	398	10-04	0100	6.51	1,210
09-30	1800	10.5	5,060	10-04	0600	5.95	885
09-30	2000	12.12	7,290	10-04	1200	5.50	660
09-30	2200	9.35	3,680	10-04	1800	5.19	506
09-30	2400	7.50	1,940	10-04	2400	4.99	426
10-01	0300	7.25	1,740	10-05	0600	4.82	358
10-01	0600	6.62	1,280	10-05	1200	4.68	304
10-01	1200	5.64	730	10-05	1800	4.54	262
10-01	1800	5.12	478	10-05	2400	4.44	232
10-01	2400	4.81	354				

(37) 09471000 San Pedro River at Charleston, Ariz.

09-28	0100	2.24	14	10-01	0230	7.43	6,630
09-28	0100	5.00	1,040	10-01	0600	6.28	3,100
09-28	0300	6.12	2,770	10-01	1200	5.40	1,550
09-28	0500	5.00	1,040	10-01	1800	4.60	650
09-28	0700	4.25	480	10-01	2130	4.42	560
09-28	0800	4.21	462	10-01	2230	4.50	601
09-28	1100	3.65	262	10-01	2400	4.32	510
09-28	1200	4.21	480	10-02	0630	4.02	385
09-28	1300	3.86	330	10-02	0830	5.00	1,040
09-28	1900	3.22	147	10-02	0930	6.00	2,540
09-28	2000	4.50	601	10-02	1030	6.28	3,100
09-28	2400	4.72	738	10-02	1130	6.90	4,790
09-29	0300	4.60	650	10-02	1300	6.70	4,190
09-29	0600	4.90	927	10-02	1730	5.89	2,320
09-29	0730	4.98	1,020	10-02	2100	6.70	4,190
09-29	1200	4.43	566	10-02	2400	7.10	5,430
09-29	1800	3.87	335	10-03	0400	7.95	8,560
09-29	2400	3.50	222	10-03	0800	6.69	3,920
09-30	0500	3.35	182	10-03	1200	6.10	2,720
09-30	0800	4.00	380	10-03	1700	5.75	2,080
09-30	1200	3.35	178	10-03	2000	5.94	2,430
09-30	1400	3.30	168	10-03	2400	5.70	2,000
09-30	1500	3.38	185	10-04	0600	5.54	1,750
09-30	1530	3.34	178	10-04	1200	5.00	1,040

(37) 09471000 San Pedro River at Charleston, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-30	1630	5.35	1,480	10-04	1800	4.60	650
09-30	2100	4.08	408	10-04	2400	4.40	552
09-30	2400	6.60	3,900				

(38) 09471550 San Pedro River near Tombstone, Ariz.

09-28	0400	2.97	15	10-01	0600	7.11	6,550
09-28	0500	5.02	1,970	10-01	0700	6.62	5,260
09-28	0700	4.80	1,630	10-01	0800	6.11	4,040
09-28	0900	4.94	1,840	10-01	1000	5.52	2,820
09-28	1000	4.74	1,500	10-01	1100	5.59	2,950
09-28	1100	5.13	2,140	10-01	1200	5.42	2,630
09-28	1400	4.07	636	10-01	1500	5.13	2,140
09-28	1600	4.18	760	10-01	1800	4.66	1,380
09-28	1900	4.05	616	10-01	2400	4.27	852
09-28	2100	4.22	800	10-02	0200	4.40	1,020
09-28	2200	4.15	729	10-02	0600	4.22	800
09-28	2400	5.02	1,970	10-02	0900	5.29	2,400
09-29	0100	5.06	2,030	10-02	1200	6.78	5,660
09-29	0600	4.50	1,160	10-02	1400	6.00	3,790
09-29	0900	4.86	1,690	10-02	1515	9.2	13,600
09-29	1100	4.80	1,600	10-02	1700	7.81	8,590
09-29	1500	4.41	1,040	10-02	1800	7.52	7,720
09-29	1700	4.27	852	10-02	2100	6.27	4,410
09-29	1800	4.16	740	10-02	2200	6.46	4,860
09-29	2100	3.94	504	10-02	2400	6.36	4,620
09-29	2400	3.83	494	10-03	0200	6.57	5,130
09-30	0400	3.64	332	10-03	0400	7.10	6,520
09-30	0600	3.84	506	10-03	0600	------	7,600
09-30	0800	4.12	780	10-03	0800	------	8,600
09-30	0900	4.19	850	10-03	1000	------	6,200
09-30	1000	4.99	1,920	10-03	1200	------	4,000
09-30	1200	4.61	1,360	10-03	1800	------	2,500
09-30	1300	4.34	1,020	10-03	2100	------	2,100
09-30	1500	3.96	620	10-03	2400	------	2,400
09-30	1800	3.71	389	10-04	0600	------	2,100
09-30	1900	3.72	398	10-04	1200	------	1,700
09-30	2000	4.86	1,720	10-04	1500	------	1,400
09-30	2200	4.52	1,250	10-04	1700	4.56	1,240
09-30	2400	4.20	860	10-04	2000	4.43	1,060
10-01	0200	5.61	2,990	10-04	2400	4.31	917
10-01	0500	7.13	6,600				

(39) 09472000 San Pedro River near Redington, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-01	0630	9.15	91	10-01	1000	13.6	4,070
10-01	0800	9.60	240	10-01	1100	17.85	12,200
10-01	0900	11.65	1,780	10-01	1200	19.0	15,400
10-01	1230	17.30	16,400	10-01	1400	18.0	12,500
10-01	1500	16.25	13,100	10-03	2100	12.6	2,940
10-01	1600	17.8	12,100	10-03	2200	13.1	3,000

(39) 09472000 San Pedro River near Redington, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-01	1700	18.15	12,900	10-03	2330	13.1	3,000
10-01	1800	18.10	12,800	10-03	2400	12.9	2,680
10-01	1900	17.25	10,800	10-04	0400	11.88	1,210
10-01	2030	18.15	12,900	10-04	0530	12.0	1,370
10-01	2200	18.25	8,740	10-04	1000	11.28	614
10-01	2300	15.00	6,370	10-04	1030	11.48	781
10-01	2400	14.60	5,670	10-04	1100	11.25	589
10-02	0130	13.50	3,920	10-04	1300	11.80	1,130
10-02	0300	14.60	5,670	10-04	1500	11.63	941
10-02	0400	14.48	5,470	10-04	1600	12.11	1,510
10-02	0500	17.55	11,500	10-04	1700	11.78	1,100
10-02	0600	20.25	19,800	10-04	1830	12.15	1,560
10-02	0630	21.60	25,400	10-04	2130	11.58	876
10-02	0800	19.00	15,500	10-04	2300	11.70	1,080
10-02	0900	21.15	23,500	10-04	2400	11.98	1,600
10-02	1000	17.45	11,300	10-05	0500	11.60	917
10-02	1100	14.90	6,190	10-05	0700	11.50	876
10-02	1230	13.90	4,530	10-05	0800	11.0	409
10-02	1300	15.3	7,280	10-05	0930	11.50	797
10-02	1700	14.85	6,460	10-05	1030	11.20	553
10-02	2000	13.5	4,220	10-05	1100	12.17	1,570
10-02	2400	15.35	7,380	10-05	1500	11.75	1,070
10-03	0200	15.0	6,730	10-05	1700	11.42	735
10-03	0430	12.7	3,070	10-05	2000	11.20	553
10-03	0800	13.6	4,370	10-05	2400	11.38	688
10-03	0830	12.7	3,070	10-06	0800	11.45	758
10-03	1430	13.15	3,700	10-06	1500	11.08	465
10-03	1500	12.6	3,940	10-06	2400	10.80	285
10-03	1600	14.55	5,930				

(41) 09473000 Aravaipa Creek near Mammoth, Ariz.

09-29	2400	2.63	91	10-01	0645	2.81	144
09-30	0500	3.05	216	10-01	0730	3.51	414
09-30	0700	2.99	200	10-01	0830	4.32	926
09-30	0800	3.67	170	10-01	0930	5.45	1,730
09-30	1000	3.34	336	10-01	1015	6.39	2,600
09-30	1300	3.35	340	10-01	1100	8.64	5,460
09-30	1500	4.62	1,140	10-01	1200	9.93	7,440
09-30	1700	4.87	1,310	10-01	1300	10.22	7,920
09-30	2000	4.42	1,020	10-01	1400	10.88	9,040
09-30	2400	3.34	336	10-01	1800	16.76	70,800
10-01	0300	3.13	273				

(42) 09473100 San Pedro River below Aravaipa Creek, near Mammoth, Ariz.

09-29	0300	3.55	569	09-30	1400	6.25	3,410
09-29	0400	3.74	665	09-30	1530	5.85	2,750
09-29	0600	3.70	637	09-30	1600	6.35	3,580
09-29	0700	3.85	747	09-30	1900	6.95	4,730
09-29	0800	4.24	987	09-30	2100	6.29	3,480

(42) 09473100 San Pedro River below Aravaipa Creek, near Mammoth, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-29	0900	4.34	1,080	09-30	2400	4.75	1,550
09-29	1200	4.05	866	10-01	0030	4.86	1,450
09-29	1300	4.10	908	10-01	0100	5.22	1,880
09-29	1400	4.29	1,030	10-01	0430	4.88	1,470
09-29	1430	4.35	1,090	10-01	0830	5.18	1,820
09-29	1930	3.92	762	10-01	1000	6.55	3,950
09-29	2000	4.13	934	10-01	1200	8.35	8,090
09-29	2230	4.25	996	10-01	1300	10.09	13,600
09-29	2400	4.15	952	10-01	1400	11.27	18,200
09-30	0100	4.07	883	10-01	1600	12.79	27,300
09-30	0430	4.50	1,180	10-01	1800	15.29	55,300
09-30	0600	5.05	1,670	10-01	1900	16.82	86,100
09-30	0900	5.77	2,630	10-01	2000	17.02	91,100
09-30	0930	6.00	2,990	10-01	2100	17.7	135,000
09-30	1200	5.95	2,910				

(44) 09474000 Gila River at Kelvin, Ariz.

09-29	0300	5.95	718	10-01	0500	9.60	3,300
09-29	0400	6.86	1,230	10-01	0700	8.80	2,620
09-29	0500	7.40	1,570	10-01	0800	8.60	2,450
09-29	0600	7.55	1,680	10-01	0900	8.55	2,420
09-29	0700	7.46	1,610	10-01	1000	8.60	2,450
09-29	0900	6.43	961	10-01	1100	8.65	2,500
09-29	1000	6.08	778	10-01	1200	9.05	2,830
09-29	1100	5.95	718	10-01	1800	11.70	5,380
09-29	1300	6.06	768	10-01	2230	15.30	9,810
09-29	1500	6.64	1,080	10-01	2400	14.85	9,200
09-29	1600	6.93	1,280	10-02	0100	15.00	8,370
09-29	2000	7.18	1,430	10-02	0300	18.00	13,200
09-29	2100	7.33	1,530	10-02	0400	22.00	21,700
09-29	2400	6.88	1,240	10-02	0430	26.00	34,000
09-30	0200	6.61	1,070	10-02	0500	28.00	43,000
09-30	0400	6.88	1,240	10-02	0700	30.00	57,000
09-30	0600	7.77	1,830	10-02	0900	31.70	77,700
09-30	0800	7.09	1,380	10-02	1100	33.00	100,000
09-30	1000	7.26	1,480	10-02	1200	32.90	98,100
09-30	1200	7.73	1,800	10-02	1300	32.20	85,400
09-30	1400	8.19	2,140	10-02	1530	30.00	57,000
09-30	1500	8.64	2,490	10-02	1800	28.00	43,000
09-30	1600	8.66	2,500	10-02	2100	26.00	34,000
09-30	1700	8.90	2,700	10-02	2400	23.90	26,700
09-30	1800	9.05	2,830	10-03	0600	21.50	20,500
09-30	2000	9.18	2,940	10-03	1200	19.70	16,500
09-30	2200	9.15	2,910	10-03	1800	18.20	13,600
09-30	2400	9.30	3,040	10-03	2400	17.00	11,400
10-01	0200	9.75	3,440	10-04	1200	14.60	7,830
10-01	0300	9.75	3,440	10-04	2400	12.60	5,420
10-01	0400	9.65	3,340				

(48) 09480000 Santa Cruz River near Lochiel, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-28	1400	3.57	28	10-01	0700	3.88	84
09-28	1600	4.21	193	10-01	1145	3.76	56
09-28	1800	4.83	487	10-01	1900	3.84	74
09-28	1915	5.00	564	10-01	2000	4.13	160
09-28	2100	4.85	495	10-01	2200	4.60	388
09-28	2400	4.61	391	10-01	2300	4.85	495
09-29	0200	4.22	196	10-01	2400	5.18	656
09-29	0400	3.92	92	10-02	0100	5.36	756
09-29	0900	3.69	45	10-02	0400	4.88	508
09-29	1200	3.73	53	10-02	0745	4.53	350
09-29	1500	3.64	36	10-02	0900	5.14	637
09-29	1930	3.54	23	10-02	1000	6.62	1,740
09-29	2000	4.35	255	10-02	1030	7.76	3,140
09-29	2100	6.88	2,020	10-02	1115	8.22	3,880
09-29	2200	5.98	1,180	10-02	1200	8.15	3,760
09-29	2300	5.28	715	10-02	1300	8.22	3,870
09-29	2400	4.99	560	10-02	1400	7.99	3,490
09-30	0200	4.53	350	10-02	1500	7.60	2,910
09-30	0500	4.13	160	10-02	1600	7.25	2,450
09-30	0700	4.47	313	10-02	1700	6.74	1,870
09-30	0800	4.74	447	10-02	1900	6.18	1,340
09-30	0900	5.24	690	10-02	2100	5.68	961
09-30	1200	5.50	844	10-02	2300	5.37	762
09-30	1300	5.65	937	10-02	2400	5.21	670
09-30	1500	6.16	1,320	10-03	0200	4.98	560
09-30	1700	5.92	1,130	10-03	0500	4.93	534
09-30	1800	5.53	861	10-03	0700	4.65	409
09-30	1900	5.20	670	10-03	1100	4.33	242
09-30	2100	4.69	424	10-03	1500	4.05	132
09-30	2400	4.26	215	10-03	2000	3.88	84
10-01	0100	4.16	170	10-03	2400	3.79	63
10-01	0300	4.03	125				

(49) 09480500 Santa Cruz River near Nogales, Ariz.

09-28	1300	3.99	23	09-30	2000	7.10	3,960
09-28	1400	4.67	285	09-30	2200	7.06	3,880
09-28	1500	5.18	800	09-30	2400	6.55	3,260
09-28	1600	4.68	290	10-01	0400	5.68	1,560
09-28	1700	4.69	296	10-01	0800	5.19	800
09-28	1800	5.08	690	10-01	1200	5.02	621
09-28	2100	4.59	235	10-01	1800	4.93	491
09-28	2400	4.48	178	10-01	1900	5.10	704
09-29	0100	4.48	178	10-01	2100	5.12	726
09-29	0200	5.52	1,260	10-01	2200	5.69	1,580
09-29	0400	5.17	780	10-01	2400	5.51	1,230
09-29	0500	5.15	760	10-02	0100	5.56	1,300
09-29	0600	5.25	910	10-02	0300	5.50	1,220
09-29	0800	5.24	900	10-02	0400	5.84	1,890
09-29	1200	4.96	520	10-02	0500	5.76	1,770
09-29	1600	4.83	338	10-02	0700	5.95	2,050
09-29	1700	7.0	3,860	10-02	0800	6.05	2,280
09-29	1800	8.4	5,660	10-02	1000	6.60	3,360
09-29	1900	6.80	3,560	10-02	1100	7.55	4,540
09-29	2000	5.25	910	10-02	1200	8.45	5,770
09-29	2100	5.03	640	10-02	1300	8.60	5,980
09-29	2400	4.91	474	10-02	1400	9.2	7,230
09-30	0400	4.70	290	10-02	1500	11.0	12,000
09-30	0600	4.74	314	10-02	1600	12.40	16,200

(49) 09480500 Santa Cruz River near Nogales, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-30	0700	4.90	465	10-02	1700	10.58	10,800
09-30	0800	4.93	492	10-02	1800	9.4	7,720
09-30	0900	5.90	1,980	10-02	1900	8.5	5,770
09-30	1000	6.66	3,380	10-02	2000	7.3	4,230
09-30	1100	6.78	3,520	10-02	2400	6.85	3,660
09-30	1200	6.25	2,580	10-03	0200	5.85	1,980
09-30	1300	6.40	2,960	10-03	0500	5.43	1,260
09-30	1500	6.31	2,680	10-03	0600	5.62	1,470
09-30	1600	6.85	3,660	10-03	1100	4.98	631
09-30	1700	7.15	4,060	10-03	1200	5.05	760
11-30	1800	8.1	5,260	10-03	1700	5.06	770
09-30	1900	7.35	4,260	10-03	2400	4.8	465

(55) 09482000 Santa Cruz River at Continental, Ariz.

09-29	2200	2.64	110	10-01	1100	8.96	5,500
09-29	2300	5.17	1,540	10-01	1200	10.10	7,040
09-29	2400	5.79	2,110	10-01	1400	9.68	6,450
09-30	0100	8.26	4,640	10-01	1500	11.13	8,620
09-30	0200	8.87	5,390	10-01	1700	12.16	10,900
09-30	0215	9.04	5,600	10-01	1800	12.74	12,500
09-30	0300	8.64	5,100	10-01	2100	11.88	10,200
09-30	0400	7.51	3,790	10-01	2200	12.80	12,600
09-30	0500	5.39	1,740	10-01	2400	14.01	18,100
09-30	0600	4.51	985	10-02	0200	14.52	22,200
09-30	0700	4.03	653	10-02	0300	13.57	15,800
09-30	0800	4.17	756	10-02	0500	12.42	11,600
09-30	0900	3.88	552	10-02	0600	11.54	9,480
09-30	1000	3.73	480	10-02	0700	11.52	9,440
09-30	1100	3.54	376	10-02	0900	10.65	7,830
09-30	1200	3.52	367	10-02	1100	12.11	10,800
09-30	1300	3.40	300	10-02	1200	12.89	12,900
09-30	1400	3.28	257	10-02	1300	13.93	17,600
09-30	1500	3.32	271	10-02	1400	15.37	30,700
09-30	1600	3.32	271	10-02	1445	16.34	45,000
09-30	1700	3.42	308	10-02	1600	15.11	27,900
09-30	1800	4.23	790	10-02	1700	15.52	32,500
09-30	1900	4.44	942	10-02	1800	14.76	24,400
09-30	2000	4.45	948	10-02	2000	12.70	12,400
09-30	2100	4.57	1,020	10-02	2200	13.64	16,200
09-30	2200	4.60	1,040	10-02	2300	14.24	19,800
09-30	2300	4.72	1,150	10-02	2400	13.62	16,000
09-30	2400	5.24	1,590	10-03	0300	12.28	11,200
10-01	0200	5.72	2,050	10-03	0600	11.51	9,400
10-01	0400	5.48	1,860	10-03	0900	10.09	7,020
10-01	0500	5.84	2,160	10-03	1200	9.55	6,280
10-01	0600	5.29	1,700	10-03	1500	9.06	5,630
10-01	0800	7.46	3,730	10-03	1800	8.47	4,890
10-01	0900	6.95	3,200	10-03	2400	7.86	4,180

(58) 09482500 Santa Cruz River at Tucson, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-01	1530	14.2	17,300	10-03	0500	-----	18,000
10-01	1610	14.1	14,000	10-03	0900	12.85	11,000
10-01	2040	15.4	19,500	10-03	1000	-----	11,000
10-02	0400	22.2	52,700	10-03	1200	-----	10,000
10-02	0720	18.1	28,000	10-04	1030	8.55	2,700
10-02	1115	16.25	20,500	10-04	1542	8.3	2,400
10-02	1143	16.25	20,500	10-05	1100	7.5	1,500
10-02	1610	15.35	17,500	10-05	1710	7.3	1,300
10-02	2200	-----	35,000	10-06	0800	6.78	880
10-02	2400	-----	25,000	10-07	0810	6.47	650
10-03	0200	-----	19,000				

(71) 09486000 Rillito Creek near Tucson, Ariz.

10-01	0100	------	1,000	10-02	1600	------	10,000
10-01	0500	------	1,000	10-02	1800	------	7,000
10-01	0700	------	1,200	10-02	1900	------	6,500
10-01	0900	------	1,600	10-02	2100	------	5,700
10-01	1000	------	2,000	10-02	2400	------	5,000
10-01	1200	------	7,000	10-03	0100	------	4,700
10-01	1400	------	11,000	10-03	0300	------	4,200
10-01	1600	------	15,000	10-03	0600	------	3,500
10-01	1700	------	18,000	10-03	1200	------	3,300
10-01	1900	------	22,000	10-03	1400	------	3,000
10-01	2000	------	22,000	10-03	1600	------	2,600
10-01	2200	------	18,000	10-03	1800	------	2,500
10-01	2400	------	15,000	10-03	1900	------	2,500
10-02	0100	------	13,000	10-03	2100	------	2,800
10-02	0400	------	10,000	10-03	2200	------	2,900
10-02	0700	------	8,500	10-03	2400	------	3,000
10-02	0800	------	10,000	10-04	0100	------	3,000
10-02	1000	------	20,000	10-04	0200	------	3,000
10-02	1100	------	25,000	10-04	0300	------	3,000
10-02	1200	------	29,700	10-04	2400	------	2,000
10-02	1400	------	15,000				

(74) 09486500 Santa Cruz River at Cortaro, Ariz.

09-29	1000	4.53	143	09-30	1330	8.64	3,160
09-29	1100	5.80	740	09-30	1400	8.50	2,950
09-29	1400	5.50	550	09-30	1500	7.77	1,920
09-29	1430	6.18	1,020	09-30	1700	6.99	1,110
09-29	1600	5.60	610	09-30	1900	6.53	761
09-29	1800	5.27	442	09-30	2100	6.35	640
09-29	2000	5.15	382	09-30	2300	6.83	984
09-29	2100	5.80	740	09-30	2400	7.75	1,900
09-29	2200	8.8	4,350	10-01	0100	7.79	1,950
09-29	2330	10.00	6,850	10-01	0300	7.59	1,710
09-29	2400	9.77	6,020	10-01	0500	7.89	2,070
09-30	0200	8.36	3,340	10-01	0600	8.47	2,900
09-30	0300	8.16	3,040	10-01	0700	9.09	3,840
09-30	0400	8.51	3,560	10-01	0800	9.78	5,210
09-30	0600	8.89	4,230	10-01	0900	10.76	7,500
09-30	0700	11.01	8,630	10-01	1000	12.82	13,900
09-30	0800	11.80	10,400	10-01	1100	14.3	19,800
09-30	0900	11.38	9,140	10-01	1200	15.4	25,000

(74) 09486500 Santa Cruz River at Cortaro, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-30	1000	10.05	5,750	10-01	1230	15.95	35,000
09-30	1100	8.71	3,260	10-01	1245	16.19	48,000
09-30	1200	8.37	2,760	10-01	1400	13.74	18,000
09-30	1230	8.71	3,250	10-01	1445	13.19	15,000
09-30	1300	8.55	3,020	10-01	1500	15.49	25,000

(80) 09489500 Black River below Pumping Plant, near Point of Pines, Ariz.

09-29	0100	3.14	226	10-01	1200	9.7	5,350
09-29	0400	3.23	256	10-01	1300	10.22	5,990
09-29	0800	4.07	591	10-01	1400	10.05	5,780
09-29	1400	4.21	653	10-01	1800	11.35	7,500
09-29	2000	4.07	591	10-01	1900	12.4	9,010
09-29	2400	4.15	630	10-01	2100	14.5	12,800
09-30	0400	4.65	938	10-01	2400	16.8	16,400
09-30	0900	6.00	2,170	10-02	0100	17.3	17,300
09-30	1200	6.65	2,640	10-02	0400	14.5	12,300
09-30	1500	7.60	3,360	10-02	0800	11.0	7,020
09-30	1600	8.25	3,890	10-02	1200	8.6	4,120
09-30	2000	8.75	4,330	10-02	1800	6.3	2,010
09-30	2400	8.5	4,100	10-02	2400	5.85	1,660
10-01	0930	7.9	3,430				

(81) 09490500 Black River near Fort Apache, Ariz.

09-28	1630	3.35	504	10-01	1400	22.50	33,800
09-28	1700	5.00	1,340	10-01	1430	23.10	35,800
09-28	1730	5.55	1,710	10-01	1530	22.85	35,000
09-28	1800	5.05	1,370	10-01	1600	23.20	36,100
09-28	1900	4.45	1,010	10-01	1800	21.50	30,900
09-28	2000	4.05	808	10-01	1900	20.20	27,000
09-28	2100	3.75	667	10-01	2100	18.20	21,800
09-28	2400	3.25	465	10-01	2300	17.40	19,900
09-29	0130	3.03	386	10-01	2400	17.65	20,500
09-29	0200	3.85	717	10-02	0300	19.50	25,100
09-29	0300	4.67	1,140	10-02	0400	20.75	28,500
09-29	0800	3.86	717	10-02	0500	22.30	33,200
09-29	1100	3.68	636	10-02	0600	23.30	36,400
09-29	1400	3.58	593	10-02	0900	24.80	44,200
09-29	1730	3.53	572	10-02	1300	23.00	35,400
09-29	1900	3.55	581	10-02	1400	21.00	29,200
09-29	2000	3.75	667	10-02	1700	18.80	23,300
09-29	2100	3.92	745	10-02	1900	18.55	22,700
09-29	2200	4.30	931	10-02	2100	18.30	22,100
09-29	2300	5.00	1,340	10-02	2200	18.10	21,600
09-29	2400	5.45	1,650	10-02	2400	17.35	19,800
09-30	0100	5.70	1,830	10-03	0300	15.60	15,900
09-30	0300	6.25	2,190	10-03	0700	13.90	12,500
09-30	0600	7.75	3,560	10-03	1000	12.95	10,900
09-30	0800	8.15	3,970	10-03	1800	11.25	8,060
09-30	1000	8.45	4,330	10-03	2400	10.40	6,820
09-30	1130	11.63	8,860	10-04	0600	9.65	5,750
09-30	1400	12.47	10,200	10-04	1200	9.00	4,900
09-30	1600	10.90	7,710	10-04	1800	8.55	4,380
09-30	1900	10.90	7,710	10-04	2400	8.20	3,940
09-30	2000	10.15	6,400	10-05	1200	7.55	3,240
09-30	2200	8.96	4,890	10-05	2400	7.05	2,740

(81) 09490500 Black River near Fort Apache, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-30	2400	9.45	5,480	10-06	1200	6.65	2,340
10-01	0500	10.55	8,530	10-06	2400	6.35	2,110
10-01	0730	10.92	7,550	10-07	1200	5.93	1,800
10-01	0900	12.30	9,960	10-07	2400	5.67	1,600
10-01	1000	13.90	12,700	10-08	1200	5.55	1,500
10-01	1200	17.00	18,900	10-08	2400	5.25	1,300
10-01	1300	20.00	26,400				

(82) 09491000 North Fork White River near McNary, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-28	0100	1.45	38	09-30	2400	4.30	758
09-28	0700	1.44	37	10-01	0200	4.02	681
09-28	1200	1.81	75	10-01	0800	3.98	664
09-28	1800	2.65	230	10-01	1200	4.89	1,090
09-28	2300	2.75	253	10-01	1700	5.80	1,620
09-28	2400	2.63	225	10-01	1900	5.27	1,300
09-29	0600	2.19	127	10-01	2400	4.99	1,140
09-29	1600	2.19	127	10-02	0200	4.89	1,090
09-29	2200	2.73	242	10-02	0600	5.39	1,370
09-29	2400	2.75	246	10-02	0845	6.78	2,310
09-30	0600	3.57	474	10-02	1200	6.05	1,790
09-30	1200	4.50	847	10-02	1500	5.62	1,510
09-30	1500	4.97	1,080	10-02	1900	5.20	1,260
09-30	1800	4.78	982	10-02	2400	5.03	1,170

(83) 09492400 East Fork White River near Fort Apache, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-29	2400	2.42	210	10-01	1500	4.35	1,350
09-30	0300	2.79	329	10-01	1700	4.13	1,140
09-30	0500	2.99	409	10-01	2300	3.76	848
09-30	0700	3.10	458	10-01	2400	3.73	826
09-30	1100	3.81	884	10-02	0100	3.74	834
09-30	1300	4.05	1,070	10-02	0400	4.04	1,060
09-30	1500	3.93	974	10-02	0600	4.39	1,390
09-30	1700	3.73	826	10-02	0800	4.65	1,670
09-30	1900	3.61	745	10-02	1100	4.55	1,560
09-30	2200	3.49	668	10-02	1300	4.31	1,310
09-30	2400	3.31	565	10-02	1700	3.85	914
10-01	0200	3.17	492	10-02	2000	3.74	[illegible]
10-01	0500	3.10	458	10-02	2400	3.46	650
10-01	0700	3.20	507	10-03	1200	2.96	396
10-01	1100	3.70	805	10-03	2400	2.60	263
10-01	1130	5.40	2,700	10-04	1200	2.37	197
10-01	1300	4.70	1,730	10-04	2400	2.20	156

(84) 09494000 White River near Fort Apache, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-28	1400	2.95	209	10-01	0830	7.11	2,500
09-28	1600	4.58	811	10-01	1000	8.05	3,350
09-28	1700	4.00	554	10-01	1100	8.30	3,600
09-28	1830	3.58	398	10-01	1300	9.35	4,730
09-28	1900	4.00	554	10-01	1530	10.60	6,260
09-28	1930	4.22	646	10-01	1800	9.85	5,320
09-28	2100	4.12	603	10-01	2000	9.50	4,900
09-28	2200	4.16	620	10-01	2200	9.20	4,560

(84) 09494000 White River near Fort Apache, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-28	2400	4.12	603	10-01	2400	9.05	4,390
09-29	0200	4.35	702	10-02	0230	8.88	4,200
09-29	0500	4.45	748	10-02	0400	9.25	4,610
09-29	1300	4.28	672	10-02	0430	10.50	6,130
09-29	1500	4.20	637	10-02	0600	10.82	6,550
09-29	1600	4.25	658	10-02	0700	10.72	6,420
09-29	1630	4.73	886	10-02	0730	10.94	6,710
09-29	1900	4.27	667	10-02	0800	12.15	8,270
09-29	2000	4.30	680	10-02	0900	12.56	9,410
09-29	2200	4.24	654	10-02	1200	11.10	6,800
09-29	2400	4.36	707	10-02	1400	10.45	6,060
09-30	0300	4.66	850	10-02	1700	10.06	5,570
09-30	0600	5.13	1,100	10-02	2100	9.25	4,610
09-30	1000	5.57	1,360	10-02	2400	8.65	3,960
09-30	1100	6.00	1,650	10-03	0200	8.35	3,650
09-30	1130	6.18	1,780	10-03	0800	7.70	3,020
09-30	1200	6.75	2,200	10-03	1200	7.30	2,660
09-30	1300	6.95	2,370	10-03	1600	7.07	2,470
09-30	1400	7.75	3,070	10-03	2100	6.65	2,130
09-30	1500	9.35	4,730	10-03	2400	6.57	2,060
09-30	1530	10.10	5,620	10-04	0300	6.27	1,860
09-30	1730	8.80	4,120	10-04	0830	6.00	1,680
09-30	1800	9.45	4,840	10-04	2400	5.40	1,300
09-30	2000	8.48	3,780	10-05	0600	5.18	1,180
09-30	2100	8.60	3,910	10-05	1200	5.02	1,090
09-30	2300	8.43	3,730	10-05	1800	4.86	1,000
09-30	2400	8.15	3,450	10-05	2400	4.75	948
10-01	0400	7.55	2,880	10-06	1200	4.50	826
10-01	0500	7.35	2,710	10-06	2400	4.25	716

(85) 09497500 Salt River near Chrysotile, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-28	2400	2.80	768	10-01	1500	10.99	23,500
09-29	0100	3.98	1,920	10-01	1700	11.66	27,200
09-29	0300	2.99	921	10-01	2000	14.44	45,400
09-29	0400	3.94	1,880	10-01	2100	14.43	45,300
09-29	0800	3.46	1,350	10-01	2400	13.28	37,100
09-29	1200	3.34	1,230	10-02	0200	12.52	32,200
09-29	1400	3.92	1,850	10-02	0400	12.20	30,300
09-29	1600	3.88	1,800	10-02	0700	12.99	35,200
09-29	1800	4.54	2,680	10-02	0900	13.58	39,200
09-29	1900	4.23	2,240	10-02	1000	14.46	45,500
09-29	2000	4.17	2,170	10-02	1200	14.85	48,500
09-29	2100	5.79	4,920	10-02	1330	15.84	56,600
09-29	2200	6.02	5,420	10-02	1800	13.63	39,500
09-29	2300	6.00	5,380	10-02	2100	12.56	32,500
09-29	2400	5.48	4,290	10-02	2400	12.07	29,500
09-30	0200	4.56	2,710	10-03	0300	11.51	26,300
09-30	0800	4.47	2,580	10-03	0600	10.74	22,300
09-30	0900	5.36	4,060	10-03	0900	9.88	18,200
09-30	1100	5.20	3,770	10-03	1400	8.89	14,100
09-30	1300	5.67	4,670	10-03	1800	8.29	11,900
09-30	1500	6.98	7,800	10-03	2400	7.58	9,550
09-30	1700	6.93	7,670	10-04	0600	7.11	8,160
09-30	1800	7.80	10,200	10-04	1200	6.71	7,080
09-30	2100	9.24	15,500	10-04	1800	6.37	6,230
09-30	2200	8.97	14,400	10-04	2400	6.08	5,560
09-30	2400	8.59	13,000	10-05	0600	5.84	5,030

(85) 09497500 Salt River near Chrysotile, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge in cubic feet per second	Date	Hour	Gage height, in feet	Discharge in cubic feet per second
10-01	0100	8.47	12,500	10-05	1200	5.58	4,490
10-01	0200	8.49	12,600	10-05	1800	5.35	4,050
10-01	0400	9.16	15,100	10-05	2400	5.16	3,700
10-01	0700	9.09	14,900	10-06	0600	4.99	3,400
10-01	0800	9.27	15,600	10-06	1200	4.84	3,150
10-01	0900	9.24	15,500	10-06	1800	4.71	2,940
10-01	1100	10.46	20,900	10-06	2400	4.56	2,710
10-01	1300	10.94	23,300				

(86) 09498500 Salt River near Roosevelt, Ariz.

09-29	1100	7.75	688	10-01	1200	15.80	21,000
09-29	1300	7.95	854	10-01	1400	16.70	24,900
09-29	1500	9.00	2,030	10-01	1600	18.50	33,500
09-29	1600	9.43	2,710	10-01	1830	20.15	42,500
09-29	1700	9.50	2,820	10-01	2200	19.30	37,700
09-29	1800	9.90	3,490	10-01	2400	19.90	41,100
09-29	1830	9.80	3,320	10-02	0200	20.50	44,600
09-29	2000	10.20	4,060	10-02	0430	20.75	46,000
09-29	2200	9.90	3,510	10-02	0700	20.50	44,600
09-29	2300	11.40	6,700	10-02	0930	19.75	40,200
09-29	2400	11.20	6,230	10-02	1100	19.95	41,400
09-30	0100	10.90	5,560	10-02	1200	20.80	46,400
09-30	0200	11.00	5,780	10-02	1300	21.80	52,600
09-30	0430	10.50	4,720	10-02	1500	22.90	59,100
09-30	0600	11.35	6,580	10-02	1800	22.80	59,800
09-30	0730	11.25	6,350	10-02	2000	22.50	57,100
09-30	0800	11.50	6,940	10-02	2200	21.40	50,000
09-30	1000	11.05	5,890	10-02	2400	20.50	44,600
09-30	1100	11.35	6,580	10-03	0300	19.20	37,200
09-30	1300	10.95	5,670	10-03	0600	18.30	32,500
09-30	1730	11.40	6,700	10-03	1200	16.60	24,400
09-30	2030	11.10	6,000	10-03	1600	15.50	19,800
09-30	2100	12.65	9,980	10-03	2000	14.50	16,000
09-30	2200	12.80	10,400	10-03	2400	13.85	13,700
09-30	2330	13.10	11,300	10-04	0600	13.10	11,300
09-30	2400	13.00	11,000	10-04	1200	12.60	9,840
10-01	0200	14.10	14,600	10-04	1800	12.10	8,460
10-01	0330	14.60	16,300	10-04	2400	11.78	7,630
10-01	0730	14.00	14,200				

(88) 09502000 Salt River below Stewart Mountain Dam, Ariz.

10-01	1500	3.80	587	10-04	1500	15.5	26,100
10-01	1530	7.95	6,640	10-04	2100	15.5	26,100
10-01	2100	8.00	6,730	10-04	2400	15.2	25,100
10-01	2130	12.4	16,800	10-05	0900	14.9	24,100
10-01	2200	14.7	23,500	10-05	1000	14.0	21,300
10-01	2400	15.1	24,400	10-05	1100	13.8	20,700
10-02	0400	15.7	26,800	10-05	1200	13.75	20,600
10-02	0900	15.7	26,800	10-05	2400	13.45	19,700
10-02	1300	16.4	29,200	10-06	0500	13.25	19,100
10-02	1400	17.1	31,600	10-06	0600	11.60	14,700
10-02	2300	17.5	33,300	10-06	1600	11.40	14,200
10-02	2400	17.5	33,300	10-06	1700	9.65	10,100
10-03	0700	17.2	32,000	10-06	2400	9.65	10,100

(88) 09502000 Salt River below Stewart Mountain Dam, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-03	2400	17.2	32,000	10-07	0830	9.65	10,100
10-04	1200	17.2	32,000	10-07	0930	8.25	7,200
10-04	1300	17.0	31,300	10-07	2400	8.15	7,020
10-04	1400	16.7	30,200				

(89) 09512190 Salt River at 24th Street at Phoenix, Ariz.

10-01	2400	0.73	235	10-04	1600	6.61	33,700
10-02	0415	0.61	146	10-04	1730	6.64	34,100
10-02	0430	4.50	13,200	10-04	2200	6.15	28,400
10-02	0445	5.00	17,000	10-04	2400	6.15	28,400
10-02	0600	6.49	32,300	10-05	0530	6.04	27,100
10-02	1530	6.94	37,900	10-05	1100	6.00	26,700
10-02	1700	6.86	36,900	10-05	1330	5.99	26,600
10-02	2000	7.00	38,700	10-05	1600	5.68	23,500
10-02	2400	6.67	34,400	10-05	2000	5.53	22,000
10-03	0200	6.60	33,600	10-05	2400	5.34	20,100
10-03	0700	6.63	34,000	10-06	0300	5.28	19,500
10-03	1130	6.82	36,400	10-06	0600	5.27	19,400
10-03	1330	6.80	36,800	10-06	0900	5.24	19,200
10-03	1800	6.92	37,700	10-06	1100	5.02	17,200
10-03	2400	6.86	36,800	10-06	1500	4.57	13,700
10-04	0400	6.83	36,500	10-06	1800	4.54	13,500
10-04	0730	6.84	36,600	10-06	2130	4.52	13,300
10-04	1230	6.65	34,200	10-06	2400	4.19	11,100
10-04	1400	6.73	35,200				

(90) 09519500 Gila River below Gillespie Dam, Ariz.

10-03	0100	8.38	0	10-05	0400	13.89	54,400
10-03	0200	10.55	2,420	10-05	0500	13.91	54,800
10-03	0400	11.40	10,400	10-05	0600	14.20	62,100
10-03	0600	11.89	16,600	10-05	0700	14.17	61,300
10-03	0800	12.46	24,900	10-05	0800	14.72	76,200
10-03	1000	12.89	32,000	10-05	0900	14.71	76,000
10-03	1100	12.87	31,700	10-05	1000	14.99	84,000
10-03	1200	13.03	34,600	10-05	1130	15.37	95,200
10-03	1300	13.19	38,000	10-05	1400	14.99	84,000
10-03	1400	12.98	33,600	10-05	1500	15.05	85,000
10-03	1500	13.11	36,200	10-05	1600	14.97	83,500
10-03	1600	13.28	40,000	10-05	1800	15.31	91,800
10-03	1700	13.20	38,200	10-05	1900	15.17	88,300
10-03	1800	13.40	42,600	10-05	2000	15.20	89,100
10-03	2000	13.11	36,200	10-05	2200	14.85	79,700
10-03	2100	13.36	41,700	10-05	2300	14.55	71,400
10-03	2400	13.01	34,100	10-05	2400	14.59	72,600
10-04	0100	13.09	35,800	10-06	0100	14.56	71,700
10-04	0300	13.11	36,200	10-06	0300	14.77	77,600
10-04	0400	13.29	40,200	10-06	0400	14.55	71,400
10-04	0500	13.23	38,900	10-06	0500	14.58	72,100
10-04	0800	13.28	40,000	10-06	0800	14.49	69,900
10-04	0900	13.57	45,300	10-06	1000	14.46	69,000
10-04	1000	13.32	40,900	10-06	1100	14.59	72,600
10-04	1100	13.36	41,700	10-06	1300	14.27	63,900
10-04	1200	13.25	39,300	10-06	1400	14.25	63,500
10-04	1300	13.50	44,900	10-06	1500	14.32	64,800
10-04	1400	13.50	44,900	10-06	1900	13.92	55,000

(90) 09519500 Gila River below Gillespie Dam, Ariz.--Continued

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
10-04	1600	13.77	37,600	10-06	2000	13.97	56,200
10-04	1700	13.14	38,000	10-06	2200	13.51	47,000
10-04	1800	13.38	42,200	10-06	2300	13.61	47,400
10-04	1900	13.10	36,000	10-06	2400	13.48	44,700
10-04	2000	13.33	41,100	10-07	0100	13.48	44,700
10-04	2300	13.29	38,300	10-07	1200	12.40	26,200
10-04	2400	13.26	39,400	10-07	2400	12.08	19,400
10-05	0200	13.55	46,000				

(93) 09535100 San Simon Wash near Pisinimo, Ariz

09-29	0800	1.47	0	10-01	1600	7.02	914
09-29	0900	4.98	230	10-01	1700	7.01	907
09-29	1000	6.42	558	10-01	1730	7.05	935
09-29	1315	6.68	688	10-01	1900	6.88	816
09-29	1700	6.09	447	10-01	2200	6.68	688
09-29	1800	6.15	465	10-01	2400	6.97	879
09-29	2100	5.29	270	10-02	0100	7.39	1,280
09-29	2400	4.25	149	10-02	0200	7.60	1,600
09-30	0200	3.56	89	10-02	0300	7.62	1,700
09-30	0700	3.00	50	10-02	0900	7.60	1,600
09-30	1300	2.60	27	10-02	1100	7.07	949
09-30	1900	2.38	16	10-02	1300	6.12	456
09-30	2400	2.16	6.4	10-02	1500	5.03	236
10-01	0500	2.22	8.8	10-02	1800	4.08	132
10-01	0600	2.85	41	10-02	2100	3.56	89
10-01	0700	3.80	106	10-02	2400	3.18	61
10-01	0800	4.82	210	10-03	0500	2.75	34
10-01	0900	5.76	360	10-03	1200	2.33	14
10-01	1000	6.39	546	10-03	1800	2.09	4.4
10-01	1200	6.82	774	10-03	2400	1.95	1.4

(94) 09535300 Vamori Wash at Kom Vo, Ariz.

10-01	0400	5.23	83.3	10-03	0200	10.23	6,240
10-01	0700	5.97	148	10-03	0400	10.43	8,700
10-01	0800	6.85	243	10-03	0630	10.54	10,400
10-01	0900	7.42	318	10-03	0800	10.51	9,910
10-01	1000	7.90	414	10-03	1000	10.44	8,840
10-01	1200	8.47	621	10-03	1300	10.40	8,280
10-01	1300	8.65	706	10-03	1900	10.37	7,880
10-01	1430	8.77	774	10-03	2200	10.27	6,670
10-01	1600	8.76	768	10-03	2400	10.20	5,930
10-01	1900	8.68	722	10-04	0300	10.09	4,910
10-01	2100	8.47	621	10-04	0600	9.97	3,990
10-01	2400	8.24	524	10-04	0900	9.85	3,220
10-02	0100	8.57	666	10-04	1200	9.74	2,640
10-02	0200	8.93	885	10-04	1500	9.61	2,080
10-02	0300	9.08	1,000	10-04	1800	9.48	1,630
10-02	0600	9.23	1,170	10-04	2100	9.38	1,370
10-02	0900	9.19	1,120	10-04	2400	9.26	1,210
10-02	1200	9.44	1,510	10-05	0300	9.14	1,070
10-02	1400	9.65	2,240	10-05	0600	9.04	968
10-02	1800	9.73	2,600	10-05	1200	9.07	992
10-02	2200	9.81	3,000	10-05	1700	8.95	899
10-02	2245	9.91	3,590	10-05	2200	8.64	700
10-02	2400	10.05	4,580	10-05	2400	8.17	497

(95) 09537200 Leslie Creek near McNeal, Ariz.

Date	Hour	Gage height, in feet	Discharge, in cubic feet per second	Date	Hour	Gage height, in feet	Discharge, in cubic feet per second
09-30	1645	3.25	2.2	10-02	1400	4.96	666
09-30	1715	4.74	484	10-02	1500	6.57	2,200
09-30	1815	5.16	838	10-02	1615	6.23	1,850
09-30	2100	4.45	264	10-02	1700	7.33	3,130
09-30	2400	4.09	65.9	10-02	1730	6.50	2,130
10-01	0300	3.88	28.8	10-02	1800	6.04	1,660
10-01	0900	3.56	7.4	10-02	1900	5.65	1,290
10-01	1800	3.40	3.6	10-02	2000	5.26	927
10-01	2030	3.51	6.0	10-02	2100	4.92	632
10-01	2200	3.48	5.2	10-02	2300	4.59	367
10-01	2300	3.59	8.5	10-02	2400	4.87	590
10-01	2400	4.41	236	10-03	0100	4.95	658
10-02	0100	5.55	1,190	10-03	0300	4.68	437
10-02	0300	4.94	649	10-03	0500	4.36	202
10-02	0500	4.43	250	10-03	0800	4.11	71.1
10-02	0900	4.09	65.9	10-03	1200	3.91	32.5
10-02	1000	4.30	163	10-03	1800	3.71	14.2
10-02	1100	4.10	68.5	10-03	2400	3.59	8.5
10-02	1300	4.23	118				

(96) 09537500 Whitewater Draw near Douglas, Ariz.

09-28	1000	5.50	9.2	10-01	0400	8.29	444
09-28	1100	6.15	42	10-01	0700	8.32	452
09-28	1200	6.42	62	10-01	1200	8.10	394
09-28	1400	6.57	76	10-01	1500	7.85	333
09-28	1600	6.65	84	10-01	1900	7.55	269
09-28	1800	6.75	95	10-01	2330	7.03	177
09-28	2000	6.65	84	10-01	2400	7.06	182
09-28	2200	6.54	74	10-02	0100	7.30	221
09-28	2400	6.52	71	10-02	0300	8.37	467
09-29	0600	6.57	76	10-02	0600	7.99	345
09-29	1200	6.67	86	10-02	0800	7.45	249
09-29	1900	6.78	98	10-02	1000	6.94	164
09-29	2100	6.73	92	10-02	1200	6.64	126
09-29	2200	6.67	86	10-02	1400	6.73	136
09-29	2400	6.48	68	10-02	1600	6.82	148
09-30	0300	6.12	40	10-02	1800	7.04	178
09-30	0600	5.87	25	10-02	2100	7.27	216
09-30	0900	5.79	20	10-02	2400	7.31	223
09-30	1000	5.95	29	10-03	0430	7.39	238
09-30	1100	6.50	70	10-03	1000	7.27	216
09-30	1200	6.80	101	10-03	1400	7.35	230
09-30	1400	7.34	167	10-03	1700	7.54	267
09-30	1500	8.29	376	10-03	1930	7.35	230
09-30	1600	8.90	596	10-03	2200	7.20	204
09-30	1700	9.37	763	10-03	2400	6.93	162
09-30	1830	9.68	891	10-04	0200	6.62	120
09-30	2100	9.35	763	10-04	0400	6.39	80
09-30	2200	9.13	689	10-04	0600	6.27	62
09-30	2400	8.73	567	10-04	0800	6.25	60
10-01	0100	8.55	517				